

The relation between adverse childhood experiences and attachment-related anxiety and avoidance in adult romantic relationships

A study of pregnant Norwegian women

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“[...] what happens in childhood - like a child's footprints in wet cement - commonly lasts throughout life. Time does not heal; time conceals.” (Felitti, 2009, p. 131)

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Abstract

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Title: The relation between adverse childhood experiences and attachment-related anxiety and avoidance in adult romantic relationships: A study of pregnant Norwegian women.

Background and research questions: There seems to be a lack of studies investigating the consequences of adverse childhood experiences on attachment behaviours in romantic relationships in adulthood. The aim of the present study was to investigate whether adverse childhood experiences, as reported retrospectively by Norwegian pregnant women, were related to attachment-related anxiety and avoidance in their romantic relationships in adulthood after controlling for important socio-demographic characteristics. The proposed hypothetical model is that such experiences are associated with insecure attachment patterns in childhood, and that these patterns are transmitted into romantic relationships in adulthood due to the internal working models of attachment and the persistence of attachment patterns throughout life.

Method: The data reported in the present study were obtained from 1 036 pregnant women taking part in the Norwegian study “Little in Norway” (“Liten i Norge”). The participants completed a questionnaire packet containing questions related to socio-demographic information in addition to several specific self-report questionnaires. The Adverse Childhood Experiences Scale was used to measure the women’s adverse childhood exposures, and the Experiences in Close Relationships Scale was used in the measurement of attachment-related anxiety and avoidance in the women’s adult romantic relationships. Correlation- and hierarchical multiple regression analyses were carried out in the investigation of the relation between the childhood adversities and the adult attachment-related anxiety and avoidance.

Results: The results showed that there was a moderate, positive association, and that the adverse experiences made a unique, statistically significant contribution to the amount of attachment-related anxiety and avoidance after controlling for the women’s age, education, ethnic minority group status, presence of former and current mental health problems and the number of days into pregnancy at the time when they answered the questionnaires.

Conclusions: The present results yield support to the proposed hypothetical model of adverse childhood experiences and the transmission of insecure attachment patterns from childhood to adulthood.

Preface

The process of conducting this study has been like a journey.

The kind where you feel enriched of new experiences when you get home.

The kind where you have been filled with all excitement, motivation, inspiration, joy, tiredness, frustration and exhaustion along the way.

I have learned so much – both professional and personal.

There are several persons who have been of great importance to me during this process, and who have contributed significantly in the conduction of the study. I am very grateful to the Norwegian study “Little in Norway” / “Liten i Norge”, for letting me use data from their material. Your work is so important, and truly inspiring. I want to thank my supervisors Vibeke and Lars. For your invaluable and generous guidance, support and inspiring commitment. I would also like to thank Anne-Marie Halberg, for all guidance, help and availability at any time. Furthermore, I want to thank my friends. You have been my lights along the dark parts of the journey. Especially Kristina, Ida and Liv Marit; without you, the dark parts would have been so much darker and the bright parts so much dimmer. You are my second family. Last but not least, I want to thank my parents and my brothers Eivind and Anders. For your eternal love, support and guidance. You are my secure base and safe haven – always.

Oslo, October 2014

Ingrid Helen Lindboe

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1 Introduction

Every child has the right to health and a life free from violence. Each year, though, millions of children around the world are the victims and witnesses of physical, sexual and emotional violence. Child maltreatment is a huge global problem with a serious impact on the victims' physical and mental health, well-being and development throughout their lives – and, by extension, on society in general.

(Butchart, Phinney, Mian & Färniss, World Health Organization [WHO], 2006, p. 1)

[...] Intensifying child maltreatment prevention therefore requires that the seriousness of the problem should be understood. This can be achieved through good epidemiological studies that point to where and how maltreatment takes place; that measure its consequences and costs; and that, with this information, set up, carry out and evaluate prevention programs addressing the underlying causes and risk factors. (p. VIII).

Previous studies over the last five decades have reported an association between adverse childhood experiences and non-optimal physical and mental health outcomes. Research has shown that an array of these experiences is associated with deleterious effects, including a broad spectrum of health-risk behaviors. Thus, maltreatment and other adversities in infancy and childhood contribute directly and significantly to some of the leading causes of death and chronic diseases (Butchart, Phinney, Mian & Färniss, World Health Organization [WHO], 2006). Felitti wrote; “As was demonstrated in the ACE Study, what happens in childhood – like a child's footprints in wet cement – commonly lasts throughout life. Time does not heal; time conceals” (2009, p. 131). However, conceptualizing child maltreatment and related adverse childhood experiences as a set of exposures that have broad implications for human development and prevention of public health problems is a relatively new endeavor (Anda, Butchart, Felitti & Brown, 2010).

1.1 Adverse childhood experiences

The term *adverse childhood experiences* is used by Anda et al. (2010) to emphasize the public health implications of childhood maltreatment and related experiences. The experiences referred to herein include physical, verbal and sexual abuse, physical and emotional neglect, as well as growing up in households where domestic violence is witnessed, members abuse alcohol or drugs, have mental illnesses, or exhibit criminal behaviors. It also includes the experience of relational stress, such as separation or divorce. This choice of terminology and measures of childhood experiences is largely based on the findings from the ACE Study (Anda et al., 2010).

In the present study a similar terminology and means of measurement are used. *Physical abuse* is referred to as the intentional use of physical force against a child that results in, or is likely to result in, harm to the child's health, development, dignity or survival. *Verbal abuse* is referred to as failure on the part of a parent or caregiver to provide a developmentally appropriate and supportive environment, which may have a high likelihood of damaging the child's physical or mental health, or its physical, mental, social, moral or spiritual development (Butchart et al., WHO, 2006). *Sexual abuse* is referred to as the involvement of a child in sexual activity that he or she does not fully comprehend, is unable to give informed consent to, for which the child is not developmentally prepared or else violates the laws of society. *Physical and emotional neglect* is referred to as failure on the part of a parent or other family member to provide for the development and well being of the child. Physical neglect involves the lack of food, clean clothes, protection or care from parents or caregivers, while emotional neglect involves the lack of feeling loved, important or special, or feeling that the family members didn't look out for each other, felt close to each other or supported each other. *Family dysfunction* is used as a collective term, which includes the last five categories of adverse experiences mentioned in the section above. The perpetrators of the adverse experiences may be parents, caregivers, other family members and / or persons at least five years older.

1.2 The Adverse Childhood Experiences Study

The Adverse Childhood Experiences Study (ACE Study) is described as one of the largest investigations ever conducted to assess associations between childhood maltreatment and later-life health and well-being (Centers for Disease Control & Prevention [CDC], 2011). The

study was a decade-long collaboration between Kaiser Permanente's Department of Preventive Medicine in San Diego and CDC (Redding, 2003). Felitti and Anda aimed to develop a large-scale epidemiologic study of the influence of stressful and traumatic childhood experiences on the origins of behaviors that underlie the leading causes of disability, social problems, health-related behaviors and causes of death in the United States (Redding, 2003). Unlike prior studies in this area of research, the ACE Study was designed to assess the long-term impact of childhood exposure to multiple types of adverse events on several outcomes in adults, including disease risk factors and incidence, quality of life, health care utilization and mortality (Felitti et al., 1998). More than 17 000 adult Health Maintenance Organization (HMO) members responded to a questionnaire about adverse childhood experiences (Felitti et al., 1998; Dube, Felitti, Dong, Giles & Anda, 2003b). This questionnaire, named the Adverse Childhood Experiences Scale (ACE Scale), was developed by Felitti et al. and designed for the study. It comprises ten questions about possible adverse experiences prior to age 18 years. The ten questions correspond with the ten categories of adverse events mentioned above; physical, verbal and sexual abuse, physical and emotional neglect, and five types of household dysfunction; growing up in households where domestic violence is witnessed, a parent is lost through divorce, abandonment or other reason, members abuse alcohol or drugs, have mental illnesses, or exhibit criminal behaviors.

The results of the ACE Study showed that 64% of the respondents had experienced one or more categories of adverse childhood experiences. 12.5% reported four or more exposures (Dong, Anda, Dube, Giles & Felitti, 2003). For persons reporting experience of any single category of adverse childhood experience, the probability of exposure to any additional category ranged from 65% to 93% (Felitti et al., 1998). The researchers found a strong relation between the breadth of exposure to adverse childhood experiences and each of the ten risk factors for the leading causes of death in adults. Among persons reporting four or more adverse childhood experiences, only 14% had no risk factors, whereas 56% of persons with no exposures had none of the ten risk factors. Felitti et al. concluded: "The findings suggest that the impact of these adverse childhood experiences on adult health status is strong and cumulative." (1998, p. 251). More specifically, the results showed that as compared with people with no adverse childhood experiences, those with four categories were twice as likely to be current smokers, twelve times more likely to ever have attempted suicide, seven times more likely to consider themselves as an alcoholic, ten times more likely to ever have injected drugs, four times more likely to have experienced two or more weeks of depressed

mood in the past year and three times more likely to have had 50 or more intercourse partners. The participants were middle-class, middle-aged with an average age of 57 years, 74% were college-educated. Since they were members of Kaiser Permanente, they all had jobs and adequate health care (Felitti et al., 1998). In other words, they were close to average Americans.

1.3 Replications of the Adverse Childhood Experiences Study

The findings from the ACE Study have been replicated in several recent studies. Using data from the 2009 Behavioral Risk Factor Surveillance System for Washington state – a cross-sectional, random-digit-dialed telephone survey conducted by health departments in 50 states in collaboration with the CDC – Nurius, Logan-Greene & Green (2012) found sustained impact of adverse childhood experiences on mental health many decades later. After controlling for all other variables, a higher number of adverse childhood experiences were negatively associated with positive outcomes on mental health symptoms and life satisfaction. Similarly, data from the Ontario Health Survey showed that childhood abuse and related adverse childhood experiences were overlapping risk factors for long-term adult health problems and that the accumulation of these experiences increased the risk of poor adult health and high health care utilization (Chartier, Walker & Naimark, 2010). Kessler et al. (2010) examined joint associations of 12 childhood adversities with first onset of 20 DSM-IV-TR (American Psychiatric Association, 2000) disorders in World Mental Health surveys in 21 countries. They found that among the 51 945 participants, childhood adversities were highly prevalent and interrelated, and had strong associations with all classes of disorders at all life-course stages in all groups of World Mental Health countries.

A number of similar investigations have shown that adverse childhood experiences increase the risk of poor health and well-being in adulthood (e.g., Afifi et al., 2008; Danese et al., 2009; Kessler, Davis & Kendler, 1997; MacMillan et al., 2001; Mersky, Topitzes & Reynolds, 2013; Schilling, Aseltine & Gore, 2007). Although there recently have been some national studies in this area, it appears to be a need of more research in Norway on the specific and enduring consequences of adverse childhood experiences.

1.4 Prevalence of adverse childhood experiences

Every year, millions of children are victim of abuse, neglect and related adverse experiences. In the World report on violence and health, Krug, Dahlberg, Mercy, Zwi and Lozano (World Health Organization [WHO], 2002) stated that child abuse for a long time has been recorded in literature, art and science. The report emphasized the fact that the historical record is filled with reports of various forms of violence against children, such as infanticide, mutilation and abandonment, in addition to reports of children exposed to neglect, malnourishment and sexual abuse. International studies have shown that, depending on the country, between a quarter and a half of all children report frequent and severe physical abuse (Butchart et al., WHO, 2006). UNICEF (2006) reported that 275 million children worldwide are exposed to violence in the home, and that between 133 and 275 million children worldwide are estimated to witness domestic violence annually. Furthermore, studies from around the world show that about 20% of women and 5-10% of men report having been sexually abused as children (Butchart et al., WHO, 2006). Gilbert et al. (2009) reported that 10% of children is neglected or psychologically abused every year. In addition, Krug et al. (WHO, 2002) point to the fact that these sources, including official statistics, case reports and population-based surveys, differ as regards their usefulness in describing the full extent of the problem. It thus appears that adverse childhood experiences are highly prevalent on a worldwide basis, and a widespread problem on a global scale.

In Norway, Mossige and Stefansen (2007) found that about 25% of 7 000 high school students had one or more experiences of physical abuse by a parent during childhood. 8% reported one or more experiences of aggravated assault from at least one parent. Additionally, they found that 22% of girls and 8% of boys had at least one experience of sexual abuse during childhood, and that 15% of girls and 7% of boys had one or more experiences of more severe sexual offenses. Schou, Dyb and Graff-Iversen (2007) found that around 4% of the 16 000 participants in the NIPH (National Institute of Public Health) youth survey reported experiences of violence from adults in the past year. Also, 6.1% of girls and 1.6% of boys reported experiences of sexual abuse during the past year. Øia (2007) found that 3.2% of youths participating in the “Ung i Oslo” (“Young in Oslo”) study reported injuries as a result of violence from parents during childhood.

In a recent report released by NKVTS (Nasjonalt Kunnskapssenter om Vold og Traumatisk Stress / National Resource Centre of Violence and Traumatic Stress), Thoresen & Hjemdal (2014) presented a study of the incidence of violence and rape in Norway in a life course perspective. Using data from the investigation “Security, violence and life quality in Norway” (“Trygghet, vold og livskvalitet i Norge”), they found that 14.2% of women (N=2 345) and 5% of men (N=2 092) reported experiences of sexual abuse – including sexual contact and sexual intercourse – before the age of 13 by a person at least five years older. The abusers were mostly men, and often familiar. Furthermore, 25.4% of women and 8.8% of men reported at least one of four other types of sexual abuse. A total of 33.6% of women and 11.3% of men reported that they had experienced some form of sexual abuse during their lifetime (Thoresen & Hjemdal, 2014).

Additionally, Thoresen & Hjemdal found that 33.0% of men and 27.7% of women reported experiences of less severe physical violence from parents during childhood (pulling, pinching, struck with an open hand). 5.1% of men and 4.9% of women had experienced severe physical violence from parents (beaten with fist, kicked, beaten up). 15.4% of women and 11.2% of men reported experiences of psychological violence from parents in childhood, and 10.0% of men and 9.9% of women had experienced physical violence between parents. Physical violence from parents often occurred for the first time in kindergarten or primary school age. Both mothers and fathers committed the violence, although fathers / male guardians were more often given as the perpetrator (Thoresen & Hjemdal, 2014).

Similar to the results from the ACE Study, Thoresen & Hjemdal found that there was great overlap between the various forms of adverse childhood experiences. Among women who reported physical violence from their parents in childhood, as many as 70% also reported psychological violence from the parents. In comparison, only 11.5% of women reported experiences of psychological violence alone. Almost half of the participants reporting severe violence from their parents also reported violence between the parents. Furthermore, there was great overlap between experiences of violence and sexual abuse in childhood and experiences of violence and sexual abuse as an adult (Thoresen & Hjemdal, 2014). Other noteworthy findings – similar to the ones reported in the ACE Study – were that among both men and women, there was a positive correlation between reporting severe violence and rape and reporting marital status as separated or divorced at the time of the interview, experience of poor economy and poorer mental health. In addition, there was a positive correlation

between the number of violence categories and mental health problems – including anxiety, depression and posttraumatic reactions (Thoresen & Hjemdal, 2014).

It is obvious that adverse childhood experiences, such as severe physical violence and serious sexual abuse, affect a significant portion of the population in Norway, and that it for many individuals started in early childhood.

1.5 Consequences of adverse childhood experiences on development

Research on brain development, trauma and interaction has contributed to our understanding of the consequences of adverse childhood experiences on cognitive, emotional and social development. It is now well established that childhood maltreatment has a profound impact on the emotional, behavioral, social, cognitive and physical functioning of children (Perry, 2000). Neuroscientists have shown that throughout the entire process of development, beginning before birth, the brain is affected by environmental conditions, including the kind of nourishment, care, surroundings and stimulation the individual child receives (Shore, 1997). Shore emphasizes that experiences early in life not merely influence the general direction of the development, but directly affect the way the brain is “wired”. It is generally believed that the most important early experiences that influence the shaping of the neural circuitry and network are the child’s interaction with his or her primary attachment figures. This interaction also directly affects (and either enhances or inhibits) the affective and physiological reactions of the child’s innate regulatory circuits (Wennerberg, 2011). In the same vein, Butchart et al., WHO (2006) point to the growing body of research on the effects of maltreatment on the developing brain, and the increasingly clear indications that the brain’s development can be physiologically altered by prolonged, severe or unpredictable stress – including maltreatment – during a child’s early years. It is generally assumed that such alterations in the brain’s development can in turn negatively affect the child’s emotional, social, cognitive and physical growth.

Although the importance of early experiences and interaction is evident, it is also known that the majority of neglect and violence against children is committed by parents or primary caregivers (Kvello, 2010). The specific consequences of such inadequate and harmful care on the individual child depend on characteristics of the child and other risk and protective

factors. Children experience traumatic events differently. Their capacity to deal with such events may depend on their age and developmental level (Borgen et al., 2011). The consequences also depend on the breadth of exposure to adverse experiences, as shown in the ACE Study. Borgen et al. (2011) reported that events involving breach of trust and aggressive behavior from caregivers may have particularly deleterious consequences for child development. Thus, adverse childhood experiences such as abuse, neglect and domestic violence of caregivers differ from other traumatic events in that they involve a violation of the basic security of the child–caregiver relationship. When the relationship between children and their primary caregivers is involved in the adverse experiences, children cannot seek security and comfort from their caregivers in the same way they normally would have done in order to handle scary situations. This is often termed *relational traumas* (Alexander, 2013).

Killén (2010) emphasizes that children may experience various forms and degrees of deprivation and fear as their parents may be unavailable, invasive, unpredictable and at some times exposing them to dangerous, turbulent and traumatic situations. Similarly, Masterson (1981) claims that a child exposed to early emotional neglect blocks the primary, fundamental need to become a separate, independently functioning individual. He describes the following condition as a sort of resigned depression that threatens the child’s psychological survival, which the child has to get away from or reduce. To protect itself from anxiety and depression, the child has to give up its own development and develop a “false self” in order to adjust to the attachment figure’s conditions and demands (Masterson, 2000; Winnicott, 1960a). Wennerberg (2011) explains this as a vital need of the child to preserve his or her attachment relationships, which according to attachment theory is a deeply inherited, instinctive survival need.

1.6 Consequences of adverse experiences on children’s attachment and attachment relationships

Attachment theorists emphasize that development takes place in a relational context. They perceive the infant as a social being who depends on human contact and care to mature and fulfill his or her potential (e.g., Bowlby, 1988; Fonagy, 2001; Schore, 1994; Stern, 1995; Winnicott, 1990). Children’s need to connect with caregivers is highlighted as supportive and promotional for development. The perception of the child as a social being is fundamental in these theorists’ understanding of attachment.

Bowlby was the first to use the term attachment systematically (cf., Hart & Schwartz, 2009). He defines it as the emotional bond between the infant and its attachment figures, usually caregivers, which develops from birth. He furthermore describes attachment as the child's motivation to seek comfort and protection from attachment figures when feeling anxious or fearful, either because of separation from attachment figures or due to something in the child's immediate environment that makes it anxious or afraid (Bowlby, 1988). In this way, attachment can be understood as a fundamental motivation in all children, and not as an endogenous trait that children have in a greater or lesser degree (Zachrisson, 2010). This motivation is often defined as an innate, biological capacity that makes children able to connect with caregivers and other close persons (Hart & Schwartz, 2009). The attachment system can be described as supporting two major functions; a protective and coping function when the child is faced with dangerous situations, termed "safe haven", and an exploratory function by ensuring the availability of the attachment figure, termed the "secure base" (Kaehler, Babcock, DePrince & Freyd, 2013).

Winnicott points to the importance of an "almost complete adaptation of the mother", and of an intense preoccupation with the child that protects and supports the creation of a coherent mental life (Winnicott, 1990). Similarly, Bowlby, Fonagy, Schore and Stern also perceive the child's social environment as crucially important to its mental development. They all highlight that the caregiver's interactions with the child can either support and facilitate, or conversely inhibit the child's psychological maturation (Hart & Schwartz, 2009). Bowlby strongly emphasized the importance of the child's "real experiences" in interaction with primary attachment figures - the early non-verbal emotional interaction patterns - because these experiences are fundamental to the child's understanding of itself and others. He termed this understanding the *internal working model* of attachment. Bowlby argued that the first attachment relationship is uniquely significant because it underlies and largely determines how the individual feels, thinks and acts in close relationships later in life (Wennerberg, 2011). The internal working model contains mental representations or inner pictures of self and the attachment figure, and expectations of how the attachment figure will respond to the child's attachment behavior. Bowlby emphasized that these inner pictures are active processes that the individual uses to form predictions about the future, and that they therefore also determine his or her behavior. This means that the internal working model actively and dynamically contributes in shaping the individual's way of being and acting in close

emotional relationships (Wennerberg, 2011). Likewise, Fonagy, Schore, Stern and Winnicott argue that it is through real interactional experiences that the child forms an internal model of the outside world and itself. They all emphasize that the daily interactions between a child and its caregiver form the basis from which the child later develops relationships to other people, itself and the outside world (Hart & Schwartz, 2009). In this way, they focus on the child's integration of the real experiences in his or her consciousness.

As noted above, children who are exposed to adverse childhood experiences caused by their caregivers (i.e., relational traumas) cannot seek protection from these attachment figures in the same way as they normally would have done. At the same time, we know that all children need to be attached to their caregivers, regardless of how they are treated. This is fundamental for their survival (Bowlby, 1988). Alexander (2013) argues that the child, in order to maintain this essential connection, monitors the whereabouts of the attachment figure and develops various sorts of strategies to avoid feeling the lack of access to this person. These strategies may involve distortions of affect and cognition. They are the basis of the categorization of attachment behaviors observed in the Strange Situation, a procedure developed by Ainsworth, Blehar, Waters & Wall (1978) comprising a laboratory-based series of separations and reunions between infants and primary caregivers. The procedure was validated with observations of parent-child interactions in their homes, and has later become well known as the "gold measure" of three widely used categories of organized attachment strategies or patterns.

Secure attachment is distinguished by the child's tendency to reconnect with the parent upon reunion, to be appropriately soothed and to quickly return to exploration and play. From the experience of using the caregiver as a secure base and safe haven, the child learns to internalize the caregiver's regulation of his or her affect, to self-soothe and to develop positive expectations of self and others. In *anxious-avoidant* attachment the caregiver is responsive only to a certain degree. The child learns that the best strategy to maintain contact with the rejecting parent is to suppress most expression of negative affect. The result is that the avoidant child fails to learn to recognize and modulate his or her own negative affect, and instead learns to be highly self-sufficient and to detach as a way to prevent further disappointment by the unresponsive caregiver. *Anxious-ambivalent* attachment is characterized by the child's tendency to show a heightened degree of negative affect to get attention from an inconsistent caregiver. This strategy may be effective in getting the parent's

attention at the moment, but the result is often that the parent avoids the child. The child tends to develop alternating strategies like fussy and demanding behavior, coy, clinging and guilt-inducing behavior (Alexander, 2013).

In addition to these three categories of organized attachment patterns, a fourth category was described by Main and Solomon (1986). They found that the three-category classification system did not adequately account for the behavior of many children with a known history of trauma in the Strange Situation experiment. The *disorganized and/or disoriented* child displays odd and approach-avoidant behaviors, dazed expressions and apparent apprehension upon reunion with caregiver in the Strange Situation. The behavior seems contradictory and out of context (Alexander, 2013). This attachment pattern has been described as the child's reaction to a type of parenting behavior to which it is not evolutionary prepared to adapt (Hesse & Main, 2006). Wennerberg (2011, p. 126) explained: "The child is no longer capable of maintaining an organized attachment behavior". Taken together, these four categories of attachment strategies or patterns are widely used in describing attachment behaviors in infants and toddlers.

Normally the attachment system, including the functions of safe haven and secure base, becomes activated under stressful conditions like perceived threats to the availability of the attachment figure, perceived danger in the environment and perceived challenges when exploring new and demanding situations. However, when the caregiver is the source of the danger, there is a paradox of approach-avoidance needs. The caregiver places the child in an unsolvable situation where the attachment figure acts both as the safe haven and as the source of threat (Kaehler, Babcock, DePrince & Freyd, 2013). Hesse and Main (2006) termed this paradox the "fright without solution". This sort of insecure and traumatic attachment relationship leads to difficulties in the child regarding mentalizing and regulating of emotions. If the child is exposed to directly traumatizing parental behavior, or if only certain feelings are allowed in the attachment relationship, the attachment doesn't work as the secure base for exploration of the intersubjective world. Freyd (1996) termed this violation of the trust that children innately have in their protective caregivers *betrayal traumas*. She argues that when psychological trauma involves betrayal, the victim may be less aware or less able to recall the traumatic experience because to do so is likely to result in confrontation or withdrawal by the betraying caregiver, threatening a necessary attachment relationship and thus the child's survival. In the Betrayal Trauma Theory (BTT), Freyd posits that in order to

maintain the necessary attachment relationship to a caregiver, a survivor of parental maltreatment must remain blind to that betrayal. She terms this “betrayal blindness”, involving an unawareness of the betrayal or violation in order to preserve a sense of security and ensure survival. This unawareness allows the child to avoid the “fright without solution” paradox. One mechanism by which the betrayal blindness may occur is dissociation, described by Bernstein & Putnam (1986, p. 727) as “[...] a lack of normal integration of thoughts, feelings and experiences into the stream of consciousness and memory”. Kaehler et al. (2013) state that a history of betrayal trauma has been linked to a broad range of psychopathological symptoms in adults, including problems in social and relationship functioning.

1.7 The role of internal working models: Consequences of adverse childhood experiences on attachment in close relationships later in life

Research has shown that various forms of adverse childhood experiences, including abuse and neglect, are detrimental to the attachment relationship between a child and its caregiver. These children are more likely than non-abused children to develop insecure attachment styles. For instance, in a meta-analysis Baer & Martinez (2006) found that the maltreated infants were significantly more likely to have an insecure attachment than the controls. Because many abused children develop insecure attachments, the internal working models of many of these children tend to reflect harsh and unpredictable relationships (Toth, Cicchetti, Macfie & Emde, 1997; Toth, Cicchetti, Macfie, Rogosch & Maughan, 2000). According to Bowlby (1973), children’s internal working models of their relationships likely mediate the well-established link between attachment quality and later social and emotional competence. As noted above, he posited that the internal working models are underlying and largely determine how the individual feels, thinks and acts in close emotional relationships later in life. Similarly, Betrayal Trauma Theory suggests that experiencing betrayal traumas may damage trust mechanisms, resulting in either insufficient or excessive trust (Freyd, 1996). Experiences of such traumas may cause the child’s internal working models to contain an understanding of other people and the outside world as not trustworthy and unsafe. James (1994) argues that survivors of adverse childhood experiences, such as abuse and neglect, tend to avoid intimacy in their relationships because the feeling of closeness increases their

feelings of vulnerability and lack of control. Intimacy represents a threat rather than love and nurturance, and therefore is not desired.

The impact that a history of betrayal trauma - or adverse childhood experiences perpetrated by a caregiver or other close family member - has on survivors' interpersonal relationships in adulthood is explored in recent research. Gobin & Freyd (2009) found that survivors of betrayal trauma, such as abuse perpetrated by someone with whom the person was "very close", reported lower levels of trust, a decreased awareness of betrayals in their intimate relationships and that they were more likely to remain in a relationship after a betrayal occurred. Owen, Quirk & Manthos (2012) found a positive association between childhood betrayal traumas and both avoidant and anxious attachment. Persons with this history perceived their romantic partners as less respectful compared to persons exposed to trauma perpetrated by someone not so close. Experiencing a betrayal trauma by someone close resulted in a devaluation of loyalty in a romantic partner (Gobin, 2012). Other research findings similarly suggest that survivors of childhood sexual abuse have more difficulties in trusting and becoming intimate with others and sustaining healthy attachment relationships than persons without such childhood experiences (Davis & Petretic-Jackson, 2000; Rumstein-McKean & Hunsley, 2001).

Although recent research has explored the impacts of adverse experiences in childhood on interpersonal relationships later in life, there still seems to be a lack of studies investigating the relation between such experiences in childhood and romantic attachment relationships in adulthood - both in the international and national research literature.

1.8 Attachment-related anxiety and avoidance in romantic relationships in adulthood

As summarized above, it is generally believed that the nature and quality of one's close relationships in adulthood are strongly influenced by affective events during childhood, particularly within the child-caretaker relationship. These events include the different types of abuse, neglect and family dysfunctions mentioned above. Over the past few decades, there has been an integration of work on adult love relationships with developmental theory and research on the nature and function of parent-child relationships. Two distinct traditions of adult attachment research have evolved. In one line of research, Main and her colleagues

focused on the possibility that adult “states of mind with respect to attachment” affected parenting behaviour – which in turn influenced the attachment patterns of the parents’ young children. Parents were interviewed about their childhood family relationships, and then the interview transcripts were searched for scorable features that could “postdict” their infants’ already known attachment classifications in the Ainsworth Strange Situation. This interview was called the Adult Attachment Interview (AAI) procedure (Hesse, 2008). In subsequent predictive studies using the AAI, the research group confirmed that parents’ interview codes were associated with independent assessments of their infants’ attachment classifications. Each of the four attachment classifications from the Strange Situation corresponded with an adult attachment classification; dismissing, anxiously preoccupied, free and autonomous, and unresolved (Bartholomew & Shaver, 1998). In the second independent line of research, Hazan and Shaver (1987) – who had been studying adolescent and adult loneliness – followed the idea of an association between chronic loneliness and insecure attachment. They reasoned that most chronically lonely young adults were unsuccessfully seeking a secure romantic relationship, and that orientations to romantic relationships might be an outgrowth of previous attachment experiences – based on Ainsworth’s three patterns of organized childhood attachment; secure, anxious and avoidant. The research in this tradition has mainly focused on the influence of attachment patterns on personal adjustment and adult relationships (Bartholomew & Shaver, 1998). Thus, these two streams of research on adult attachment have focused on parenting and romantic relationships, respectively. Bartholomew (1990) reviewed the adult attachment research in both traditions. Building on both, she proposed an expanded model of adult attachment based on Bowlby’s conception of internal working models. A four-category classification scheme was systematized, yielding four prototypical adult attachment patterns; secure, preoccupied, fearful and dismissing. The secure, preoccupied and dismissing patterns are conceptually similar to the corresponding AAI categories, and the secure, fearful and preoccupied patterns are similar to Hazan & Shaver’s secure, anxious-ambivalent and avoidant categories (Bartholomew & Shaver, 1998).

In 1998, Brennan, Clark & Shaver – from Hazan & Shaver’s tradition of adult attachment research – published an instrument called the Experiences in Close Relationships (ECR) Scale. They included items from all of the available self-report measures of adult attachment as well as items from some instruments that had appeared only in conference presentations. A subsequent factor analysis yielded two essentially independent factors labeled *anxiety* and *avoidance*. The items that loaded highest on each of these two factors were retained, and

resulted in the ECR Scale. This measure has been widely used to assess the quality of adult attachment relationships. Brennan et al. reported that the anxiety-scale correlated highly with scales measuring anxiety and preoccupation with attachment, jealousy and fear of rejection, and that the avoidance-scale correlated highly with several other scales measuring avoidance and discomfort with closeness. They furthermore argued that the subscales had the advantage of being derived from and underlie almost every other self-report adult romantic attachment measure, and that they appear crucial for capturing important individual differences in adult attachment in romantic relationships (Brennan, Clark & Shaver, 1998). In the same vein, Mikulincer & Shaver (2007) stated that the items loading on the attachment anxiety factor are reminiscent of Ainsworth et al.'s (1978) coding scales describing anxiously attached infants, by emphasizing both fear of abandonment and anger about separations. The items loading on the attachment avoidance factor are similarly reminiscent of Ainsworth et al.'s coding scales describing avoidantly attached infants, by emphasizing lack of closeness and emotional suppression. According to Mikulincer, Shaver & Pereg (2003), there now appears to be a consensus that adult attachment consists of these two dimensions; anxiety and avoidance. Wei, Russell, Mallinckrodt & Vogel (2007) define *attachment anxiety* as involving a fear of interpersonal rejection or abandonment, an excessive need for approval from others, and distress when one's partner is unavailable or unresponsive. They define *attachment avoidance* as involving fear of dependence and interpersonal intimacy, an excessive need for self-reliance, and reluctance to self-disclose. People who score high on either or both of these dimensions are assumed to have an *insecure* adult attachment pattern. People with low levels of attachment anxiety and avoidance can be viewed as having a *secure* adult attachment pattern (Brennan et al., 1998; Lopez & Brennan, 2000; Mallinckrodt, 2000).

1.9 The present study: Purpose, proposed hypothetical model and research questions

It is evident that adverse childhood experiences affect a significant portion of the population in Norway. However, there currently seems to be a lack of research on the consequences of these experiences on the persons' attachment behaviors in romantic relationships in adulthood. The aim of the present study was to investigate both the prevalence of adverse childhood experiences among a sample of Norwegian pregnant women, and whether there was a relation between the adverse experiences and the women's attachment behaviors in their adult romantic relationships. More specifically, the purpose of the study was to

investigate whether adverse childhood experiences reported retrospectively by the women were related to currently assessed attachment-related anxiety and avoidance in their romantic relationships in adulthood.

The present study emphasizes the importance of investigating the consequences of such experiences on attachment behaviors in adult romantic relationships among pregnant women. Pregnant women are a distinctive part of the population in that they are soon to be mothers and caregivers. According to Brodén (2004), women's own early life experiences and concerns about thoughts and feelings about relationships are actualized during this transitional period. Questions about own identity, background and forthcoming motherhood arise. Brodén explains: "When we become parents, our own early experiences of being a child, and how we experienced the relationship to our own parents, are activated. [...] We know that patterns of parent-child relationships are transmitted through generations." (2004, p. 26). Thus, information on whether adverse childhood experiences were related to attachment-related anxiety and avoidance in pregnant women's adult close relationships may be significant in the process of enhancing their parenting abilities and transmitting secure attachment relationships to their children. The present study may contribute to the understanding of the seriousness of the consequences of such experiences, and provide potentially significant information related to the future prevention of adverse childhood experiences.

The proposed hypothetical model is that adverse childhood experiences - as the term is used by Anda et al. (2010), including physical, verbal and sexual abuse, physical and emotional neglect, and growing up in disorganized households – is related to attachment-related avoidance and anxiety in adult romantic relationships. Research has shown that children exposed to adverse childhood experiences are more likely than non-exposed individuals to develop insecure attachment patterns, including anxious-avoidant, anxious-ambivalent and disorganized and/or disoriented. The hypothesis is that these insecure and disorganized/disoriented attachment patterns in childhood, due to the internal working models of attachment and the persistence of attachment patterns throughout life, are related to insecure attachment patterns in adulthood. Women's adverse childhood experiences, taking place during the first 18 years of life but reported retrospectively in the present study, are hypothesized to – on their own – be saliently associated with currently assessed attachment-

related anxiety and avoidance in adulthood, after controlling for important socio-demographic characteristics.

The following research questions were asked:

Are adverse childhood experiences as reported retrospectively by Norwegian pregnant women related to currently assessed attachment-related anxiety and avoidance in their romantic relationships in adulthood?

If so, is this relation still present after controlling for possible confounding factors?

2 Method

2.1 Study population

The data reported in the present study were obtained from pregnant women taking part in the Norwegian study “Little in Norway” (“Liten i Norge”). This is a longitudinal population study of infant vulnerability and plasticity from pregnancy to age 18 months. The project is supported by the Norwegian Research Council and hosted by the Network for Infant Mental Health at The Regional Center for Child and Adolescent Mental Health, Eastern and Southern Norway (RBUP Øst og Sør). Nine sites located in the north, middle, west, east and south of Norway participate in the study. The study thus includes all health regions, and is a cooperation between all four Regional Centers for Child and Adolescent Mental Health in Norway (RBUP, 2014).

The participating sites cooperated with local midwives in the recruitment of women and their partners in week 16-32 of pregnancy. The expectant mothers and fathers were informed of and recruited to the project as early in pregnancy as possible, in most cases around week 16 during the first meeting with a research assistant. Once recruited, data were obtained from both men and women. In the present study, some of the data obtained only from the participating women are reported. Five of the recruited women withdrew their consents, yielding a final sample size of 1 036 women enrolled in week 16-32 of pregnancy.

2.2 Measurement instruments and procedures

During the first meeting with the local research assistant, most often around week 16 of pregnancy, the women were asked to complete a questionnaire packet. This contained questions related to socio-demographic information, including education, minority group status and presence of former and current mental health problems, in addition to several specific self-report questionnaires. In the present study, some of the demographic information in addition to the responses on the Adverse Childhood Experiences Scale and the Experiences in Close Relationships Scale are reported.

2.2.1 Adverse Childhood Experiences Scale (ACE Scale)

Development of the instrument

As mentioned above, the Adverse Childhood Experiences Scale is a self-report questionnaire that comprises ten questions about possible adverse experiences prior to age 18 years (Felitti et al., 1998). In the development of the ACE Scale, Felitti et al. first (in wave 1 of the study) focused on eight major types of childhood trauma whose individual consequences had been studied by other researchers. These included physical, verbal and sexual abuse, in addition to the five types of family dysfunction introduced above; a parent who was mentally ill or alcoholic, a mother who was a domestic violence victim, a family member who had been incarcerated, and further the loss of a parent through divorce, abandonment or other reason. Later (in wave 2 of the study), Felitti et al. added the remaining two types of adverse experiences; emotional and physical neglect (Dube, Anda, Felitti, Edwards & Williamson, 2002). In total, the questionnaire comprises ten categories of adverse childhood experiences. Depending on the wording of the question, perpetrators of the actual adverse event may be parents, caregivers, other family members and / or persons at least five years older.

The ACE Scale scoring system

In order to quantify the relation between adverse childhood experiences and risk of physical, social and mental health problems in adulthood, a scoring system for the ACE Scale was developed. In this system, the presence of each type of the ten possible experiences counts as one point. If a person has none of the events in his or her background, the total score is zero. If someone was sexually abused several times during his or her childhood, but not subjected to other types of childhood trauma, the total score is one. If a person experienced verbal abuse and lived with a mentally ill mother and an alcoholic father, the sum score is three (Felitti et al., 1998). Thus, the ACE Scale sum score is the sum of the number of categories of adverse childhood experiences.

Reliability

Dube, Williamson, Thompson, Felitti & Anda (2004) assessed the test-retest reliability of the ACE Scale among 658 participants who completed the questionnaire at both waves of the Adverse Childhood Experiences Study. They reported weighted-kappa statistics in the range of .52 to .86 for all questions and each category of childhood abuse and household dysfunction, in addition to the total ACE score. These coefficients indicate a good reliability

as defined by Fleiss (1981), and a moderate to substantial reliability as defined by Landis & Koch (1977). Pinto, Correia & Maia (2014) investigated the reliability of retrospective reports of adverse childhood experiences among adolescents with documented childhood maltreatment. They found intraclass correlation coefficient values greater than or equal to .65, indicating a good agreement across all categories of adverse experiences. This included emotional and physical neglect, which were not assessed by Dube et al. (2004). The findings support the test-retest reliability of the ACE Scale. Additionally, Dube et al. (2003a) reported that the items included in the ACE Scale were highly interrelated and correlated. When a respondent was exposed to one adverse event, the probability of exposure to any other category of adverse events increased substantially. Several studies have observed four adverse experiences (ACE Scale sum score = 4) as the threshold marking a “high exposure” of adverse events, which is associated with significantly increased probabilities of adverse adult health outcomes (Dong et al., 2003; Dube et al., 2003b; Felitti et al., 1998).

Use of the questionnaire and scoring system in the present study

In the present study a translated form of the original ACE Scale was used. See appendix A for the English and appendix B for the Norwegian form of the original Adverse Childhood Experiences Scale. The original scoring system was used; implying that on each of the ten questions the women earned either one or zero points. One point if the answer was “yes” and they had experienced the adverse event in question, zero if the answer was “no”. A sum score was computed for each person, with a potential range from zero to ten points.

2.2.2 Experiences in Close Relationships Scale (ECR Scale)

Development of the instrument

In the development of the Experiences in Close Relationships Scale, Brennan et al. (1998) created a pool of 482 statements designed to assess 60 specific attachment-related constructs. Later they reduced the number of items to 323, before presenting them to 1 086 undergraduate students enrolled in psychology courses at the University of Texas at Austin. Participants were asked to rate all items from “not at all like me” to “very much like me”. A subsequent factor analysis of the 60 constructs yielded the two factors *anxiety* and *avoidance*. Among the 323 items, the 18 that loaded highest on each of these factors were retained. The resulting 36-item adult attachment measure was called the Experiences in Close Relationships Scale (Wei, Russell, Mallinckrodt & Vogel, 2007).

The ECR Scale was designed to assess a general pattern of adult attachment as independent as possible from the influences of the respondents' current circumstances. The original instructions state, in part: "We are interested in how you generally experience relationships, not just in what is happening in a current relationship." (Brennan et al., 1998, p. 69). All respondents who have experienced close relationships, including those who are not currently in a romantic relationship, are thus allowed to provide valid responses (Wei et al., 2007).

The ECR Scale scoring system

The following scoring method was developed for the original ECR Scale. In this self-report questionnaire, each of the 36 questions is a seven-level Likert item where 1 = strongly disagree, 4 = neutral/mixed and 7 = strongly agree. Even questions relate to the anxiety dimension whilst odd questions relate to the avoidance dimension. Ten of the questions are reversed, of which one loads on anxiety and nine load on avoidance. The scoring system implies that on each item, minimum score is 1 and maximum is 7. Thus, minimum sum score on each dimension is 18 and maximum sum score is 126. There is no clinical cut-off score for the original ECR Scale. This version has mostly been used with non-clinical samples (Wongpakaran & Wongpakaran, 2012).

Reliability and validity

Brennan et al. (1998) reported that the ECR Scale had a high level of internal consistency in a sample of undergraduates, with coefficient alpha of .91 for the anxiety subscale and .94 for the avoidance subscale. Results from other studies have supported the high level of internal consistency for the subscales (Lopez & Gormley, 2002; Lopez, Mauricio, Gormley, Simko & Berger, 2001; Lopez, Mitchell & Gormley, 2002; Vogel & Wei, 2005). The instrument has been used in a large number of studies. Mikulincer & Shaver (2007) reported a consistently high reliability with alpha coefficients near or above .90 and test-retest coefficients between .50 and .75. Furthermore they reported that the ECR Scale had performed similarly in both Israel and the United States, and that all the translated versions had produced adequate reliability coefficients and good evidence of construct validity (Mikulincer & Shaver, 2007). The validity has been demonstrated in studies that included both experimental manipulations and behavioral observations.

Use of the questionnaire and scoring system in the present study

In more recent years, a revised (ECR-R) and short (ECR-S) version of the original ECR Scale have been developed. Note that the original version was used in the present study, with Norwegian translations. See appendix C for the English and appendix D for the Norwegian form of the original Experiences in Close Relationships Scale. The scoring system for the original version was used; implying that on each of the 36 questions women got minimum one point and maximum seven points. Even questions loaded on the anxiety-scale and odd questions loaded on the avoidance-scale. The scores on questions 3, 15, 19, 22, 25, 27, 29, 31, 33 and 35 were reversed. Each person received a sum score on both dimensions, with a potential range from 18 to 126 points.

2.3 Statistical analyses

Descriptive statistics was used to assess demographic variables for the participating women, and to assess both the prevalence of various adverse childhood experiences and the distribution of sum scores on the ACE Scale and the ECR anxiety-scale and avoidance-scale. The correlations between reported adverse childhood experiences and attachment-related anxiety and avoidance in adult romantic relationships were assessed using Pearson product-moment correlation coefficients. Two hierarchical multiple regression analyses were carried out to further investigate the correlations and control for other potential predictors of attachment-related anxiety and avoidance in adulthood. In both regression analyses, age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy at the time when they answered the questionnaires were entered as predictor variables in model 1. The sum score on the ACE Scale was added as predictor variable in model 2. In the first analysis, the sum score on the ECR anxiety-scale was the outcome or dependent variable. In the second, the sum score on the ECR avoidance-scale was the outcome variable.

3 Results

3.1 Descriptive statistics

3.1.1 Characteristics of the study population

Demographic variables for the pregnant women are listed in table 1 and 2. Table 1 shows that minimum age was 17 years and maximum age was 43 years. The average age was about 30 years ($SD = 4.8$). Women's age was calculated from their date of birth and the date when they answered the questionnaires. One date of birth was missing in the material, thereby $N = 1035$. In average, the women were about 165 days into pregnancy at the time when they answered the questionnaires ($SD = 34.5$). Minimum number of days into pregnancy at this time was 55 and maximum number of days was 238.

The women's education, ethnic minority group status and presence of former and present mental health problems are presented in table 2. 3.0% of the women had elementary school as their highest completed education, 19.5% had completed high school, 35.2% had completed up to four years at college, university or vocational school and 40.8% had completed four or more years at college or university. 6.0% of the women had ethnic minority group status, 21.4% had experienced mental health problems at some point in their life and 4.8% experienced mental health problems at the time when they answered the questionnaires.

Table 1

Descriptive statistics of the women's age and days into pregnancy

Variables	N	Mean	<i>SD</i>	Range
Age ^a	1035	29.76	4.781	17-43
Days into pregnancy ^b	1036	164.32	34.535	55-238

Note. SD = standard deviation. Range = lowest and highest value.

^a Calculated from their date of birth and the time when they answered the questionnaires.

^b Number of days into pregnancy at the time when they answered the questionnaires.

Table 2

Descriptive statistics of the women's education, ethnic minority group status and presence of former and current mental health problems

Variables	Frequency	Percent	Valid percent
Education ^a			
Elementary school ^b	32	3.0	3.1
High school	205	19.5	19.8
College /university /vocational school ^c	370	35.2	35.7
College / university ^d	429	40.8	41.4
Ethnic minority group status ^e			
Yes	63	6.0	6.1
No	973	92.6	93.9
Former mental health problems ^f			
Yes	225	21.4	21.7
No	811	77.2	78.3
Current mental health problems ^g			
Yes	50	4.8	4.8
No	986	93.8	95.2

Note. N = 1036.

^a Highest completed education.

^b Nine or ten years of elementary school.

^c Up to four years at college, university or vocational school.

^d Four years or more at college or university.

^e Women were asked if they had an ethnic minority group status.

^f Women were asked if they had experienced mental health problems at some point in their life.

^g Women were asked if they experienced mental health problems at the time when they answered the questionnaires.

3.1.2 Responses on the Adverse Childhood Experiences Scale

Presented in table 3 and 4 are the women's responses and sum scores on the ACE Scale questionnaire, respectively. One response on one of the questions was missing, thereby N = 1035. 145 (13.8%) of the women reported that a household member had been mentally ill (question 9), 124 (11.8%) reported experiences of parental loss (question 6), 113 (10.8%) reported that they had lived with someone who was a problem drinker, alcoholic or used street drugs (question 8), and 105 (10.0%) reported experiences of verbal abuse (question 1). Furthermore, 86 (8.2%) reported that they had experienced emotional neglect (question 4), 65 (6.2%) reported experiences of sexual abuse (question 3) and 58 (5.5%) reported that they had been physically abused (question 2). Of the 1035 women, 378 (36%) reported one or more adverse childhood experiences. 179 (17.1%) reported two or more adverse experiences,

97 (9.3%) reported three or more and 50 (4.8%) reported four or more adverse experiences in their childhood.

Table 3

Descriptive statistics of responses on the ACE Scale

ACE Scale categories ^a	Frequency	Percent	Valid percent
1. Verbal abuse			
Yes	105	10.0	10.1
No	931	88.6	89.9
2. Physical abuse			
Yes	58	5.5	5.6
No	978	93.1	94.4
3. Sexual abuse			
Yes	65	6.2	6.3
No	971	92.4	93.7
4. Emotional neglect			
Yes	86	8.2	8.3
No	950	90.4	91.7
5. Physical neglect			
Yes	13	1.2	1.3
No	1023	97.3	98.7
6. Parental loss ^b			
Yes	124	11.8	12.0
No	912	86.8	88.0
7. Household dysfunction ^c			
Yes	36	3.4	3.5
No	999 ^g	95.1	96.5
8. Household dysfunction ^d			
Yes	113	10.8	10.9
No	923	87.8	89.1
9. Household dysfunction ^e			
Yes	145	13.8	14.0
No	891	84.8	86.0
10. Household dysfunction ^f			
Yes	34	3.2	3.3
No	1002	95.3	96.7

Note. *N* = 1035. ^a See appendix A/B for the ACE Scale questionnaire. ^b Through divorce, abandonment or other reason. ^c Mother who's a domestic violence victim. ^d Household substance abuse. ^e Mental illness in household. ^f Criminal household member. ^g One person did not answer this question.

Table 4*Descriptive statistics of the ACE Scale sum scores*

ACE Scale sum scores	Frequency	Percent	Valid percent
0	657	62.5	63.5
1	199	18.9	19.2
2	82	7.8	7.9
3	47	4.5	4.5
4	18	1.7	1.7
5	10	1.0	1.0
6	11	1.0	1.1
7	6	0.6	0.6
8	3	0.3	0.3
9	2	0.2	0.2
Total	1035	98.5	100.0

3.1.3 Responses on the Experiences in Close Relationships Scale

Table 5 and figure 1 and 2 show the women's sum scores on the ECR subscales anxiety-scale and avoidance-scale. On the anxiety-scale, the women had an average score of 44. Lowest score was 18, highest was 114 ($SD = 17.18$). On the avoidance-scale, average score was 30, lowest was 18 and highest was 90 ($SD = 12.68$).

Table 5*Descriptive statistics of the ECR subscales: anxiety- and avoidance-scale sum scores*

ECR subscales ^a	N	Mean	SD	Potential range	Actual range
Anxiety-scale sum scores	1036	44.23	17.178	18-126	18-114
Avoidance-scale sum scores	1036	30.05	12.680	18-126	18-90

Note. SD = standard deviation. Potential range = potential lowest and highest sum score. Actual range = actual lowest and highest sum score. ^a See appendix C/D for the ECR Scale questionnaire.

Figure 1

Histogram showing the sum scores on the ECR anxiety-scale

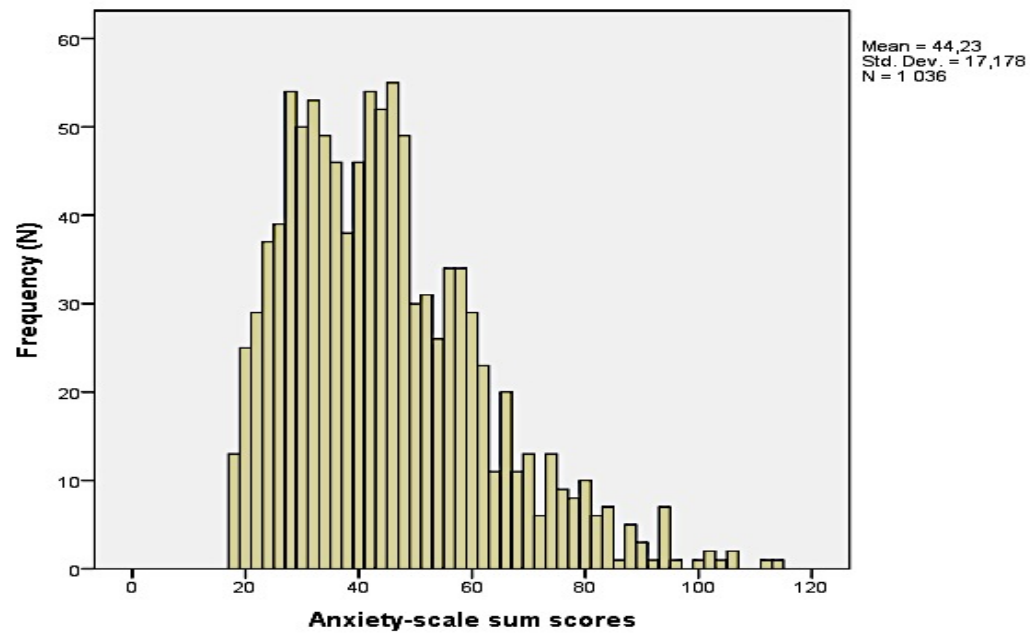
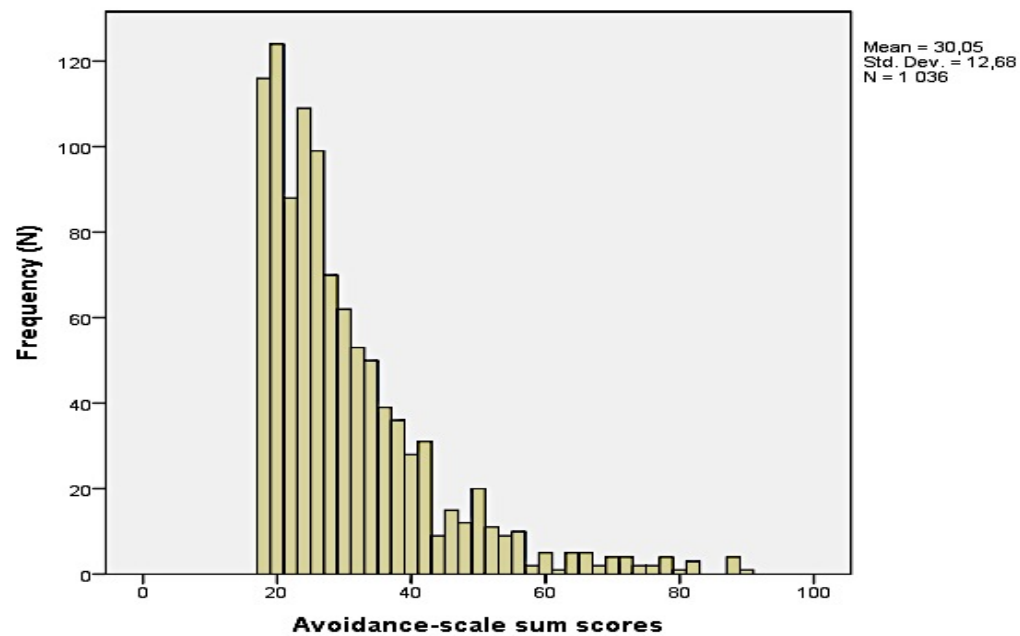


Figure 2

Histogram showing the sum scores on the ECR avoidance-scale



3.2 Correlation analyses

To assess the relation between the women's adverse childhood experiences and their attachment-related anxiety and avoidance in close relationships in adulthood, Pearson product-moment correlation coefficients (Pearson's r) were used. Correlations between responses on ACE Scale and responses on ECR subscales anxiety-scale and avoidance-scale were computed. Figure 3 and 4 show the scatterplots of the correlations, each containing a line of best fit.

The results showed that there was a positive correlation between the ACE Scale sum score and the ECR anxiety-scale sum score, $r = .238$, $N = 1035$, $p < .01$ (2-tailed), and between the ACE Scale sum score and the ECR avoidance-scale sum score, $r = .248$, $N = 1035$, $p < .01$ (2-tailed). As defined by Cohen (1992), these coefficients indicate that there was a moderate, positive correlation between the women's reported adverse childhood experiences and their reported attachment-related anxiety and avoidance in close relationships in adulthood. Increase in the number of adverse childhood experiences correlated moderately with increase in the amount of attachment-related anxiety and avoidance.

Figure 3

Scatterplot showing the correlation between the ACE Scale sum score and the ECR anxiety-scale sum score (containing a line of best fit)

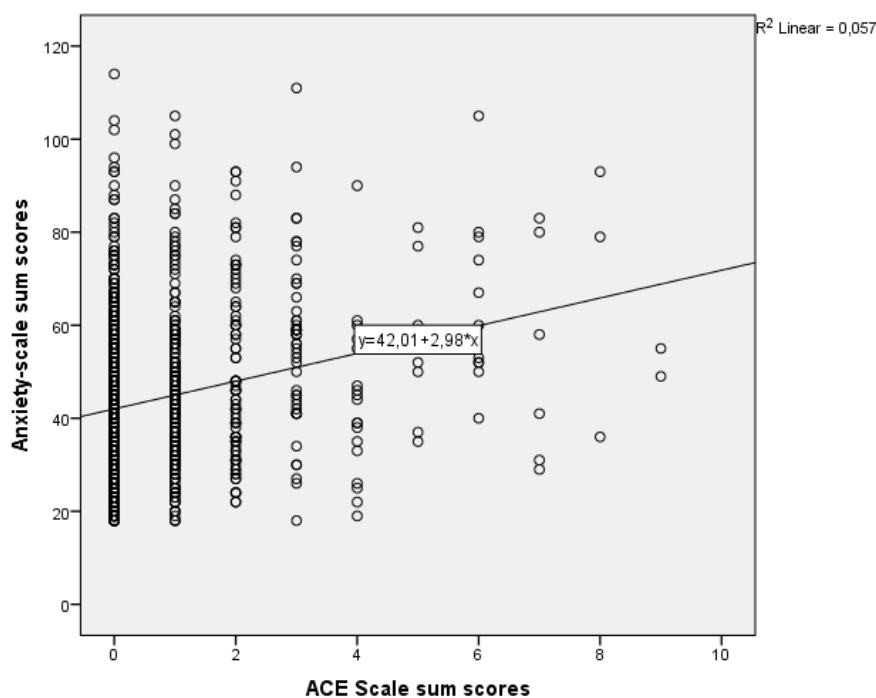
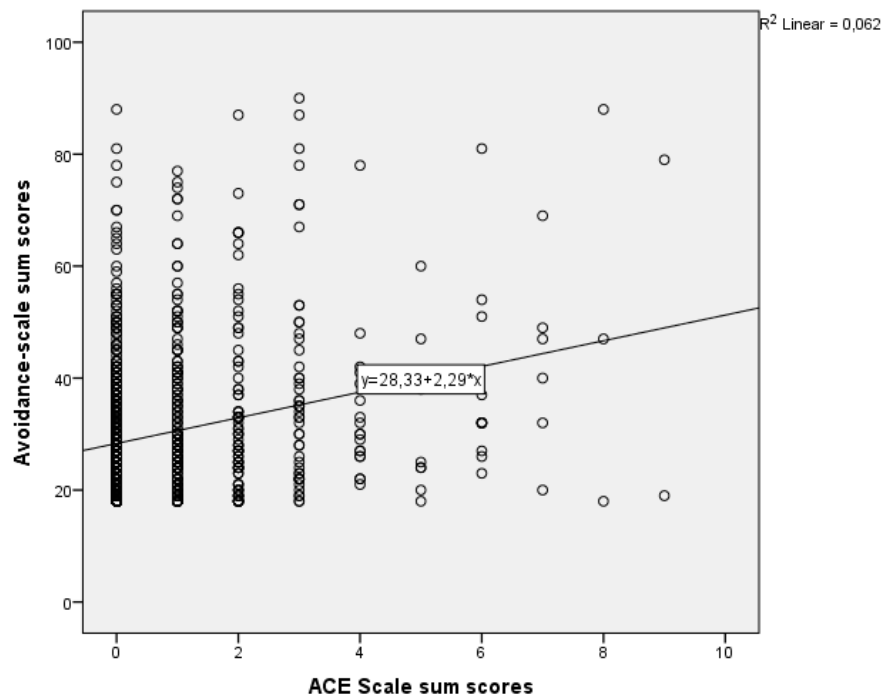


Figure 4

Scatterplot showing the correlation between the ACE Scale sum score and the ECR avoidance-scale sum score (containing a line of best fit)



3.3 Regression analyses

Two hierarchical multiple regression analyses were carried out to further investigate the association between the domains and assess whether adverse childhood experiences alone predicted attachment-related anxiety and avoidance in close relationships in adulthood. This included controlling for several potential predictors.

3.3.1 Hierarchical multiple regression analysis with the sum score on the ECR anxiety-scale as the outcome variable

Table 8 shows the hierarchical multiple regression analysis with sum score on the ECR anxiety-scale as the outcome or dependent variable. In model 1, women's age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy at the time when they answered the questionnaires were entered as predictor or independent variables. Results showed that with the exception of ethnic minority group status, all of these variables had a significant contribution to the sum

scores on the ECR anxiety-scale. Presence of former and current mental health problems were the strongest predictors ($\beta = .218$ and $.117, p < .001$), followed by age ($\beta = -.099, p < .01$), education and number of days into pregnancy ($\beta = -.073$ and $.064, p < .05$). The negative Beta values of age and education indicate a negative relationship between these variables and the sum score on the ECR anxiety-scale. In sum, women's age, education, presence of former and current mental health problems and number of days into pregnancy explained 10.3% of variance in the sum score on the ECR anxiety-scale ($R^2 = .103$). This model was statistically significant ($F(6, 1027) = 19.733, p < .001$).

Women's sum score on the ACE Scale was added as predictor variable in model 2. The results show that in this model, all variables except education and ethnic minority group status were significantly related to the sum score on the ECR anxiety scale. Former mental health problems and the ACE Scale sum score were the strongest predictors ($\beta = .189$ and $.165, p < .001$), whereas age and current mental health problems ($\beta = -.101$ and $.094, p < .01$), and number of days into pregnancy ($\beta = .063, p < .05$) also made a contribution. Again it was a negative relation between age and sum score on the ECR anxiety-scale. After entering the ACE Scale sum score in model 2, the total variance explained by the full model was 12.8% ($F(7, 1026) = 21.557, p < .001$). The introduction of women's ACE Scale sum score explained an additional 2.5% ($\Delta R^2 = .025$) of the variance on the ECR anxiety-scale sum score, after controlling for age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy. This means that women's sum score on the ACE Scale on its own was a statistically significant predictor of their sum score on the ECR anxiety-scale ($\Delta F(1, 1026) = 29.247, p < .001$).

Table 8

Hierarchical multiple regression analysis: Predictors of attachment-related anxiety in close relationships in adulthood

Variable ^a	Model 1			Model 2		
	B	SE	β	B	SE	β
Constant	51.626***	3.821		49.267***	3.795	
Age	-.357	.116	-.099**	-.363	.114	-.101**
Education	-1.479	.650	-.073*	-1.024	.647	-.050
Ethnic minority group status	3.364	2.125	.047	2.814	2.099	.039
Former mental health problems	9.085	1.289	.218***	7.881	1.291	.189***
Current mental health problems	9.351	2.481	.117***	7.523	2.471	.094**
Days into pregnancy	.032	.015	.064*	.032	.015	.063*
ACE Scale sum score				2.065	.382	.165***
R ²		.103***			.128***	
ΔR^2					.025***	
F		19.733			21.557	
ΔF					29.247	

Note. $N = 1034$. Model 1 = the first block of predictor or independent variables. Model 2 = the second block of predictor variables. B = unstandardized regression coefficient. SE = standard error for the unstandardized coefficient. β = standardized regression coefficient Beta. R^2 = amount of variance in outcome variable explained by predictor variables. ΔR^2 = additional explained variance. F = F test for the explained variance. ΔF = F test for the additional explained variance. ^a See table 2 for descriptions of the variables.

* $p < .05$. ** $p < .01$. *** $p < .001$.

3.3.2 Hierarchical multiple regression analysis with the sum score on the ECR avoidance-scale as the outcome variable

Presented in table 9 is the hierarchical multiple regression analysis with sum score on the ECR avoidance-scale as the outcome or dependent variable. As in the previous analysis, women's age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy at the time when they answered the questionnaires were entered as predictors or independent variables. Results showed that with the exception of ethnic minority group status and number of days into pregnancy, all variables were significantly related to the sum scores on the ECR avoidance-scale. Education ($\beta = -.213$), current mental health problems ($\beta = .159$), age ($\beta = .152$) and former mental health problems ($\beta = .109$) were all significant at $p < .001$ levels. There was a negative relation between education and sum score on the ECR avoidance-scale. In sum, women's age, education and presence of former and current mental health problems explained 10.0% of variance in the sum score on the ECR avoidance-scale ($R^2 = .100$). This model was statistically significant ($F(6, 1027) = 19.001, p < .001$).

Similar to the first analysis, women's sum score on the ACE Scale was added as predictor variable in model 2. The results showed that in this model, the same variables as in model 1 made a significant contribution to the sum score on the ECR avoidance-scale. Again, education ($\beta = -.189$) was the strongest predictor, followed by the ACE Scale sum score ($\beta = .182$), age ($\beta = .150$) and current mental health problems ($\beta = .134$), all significant at $p < .001$ levels. Former mental health problems ($\beta = .077$) was significant at a $p < .05$ level, while ethnic minority group status and number of days into pregnancy did not reach statistical significance. Again it was a negative relation between education and sum score on the ECR avoidance-scale. After entering ACE Scale sum score in model 2, the total variance explained by the full model was 13.0% ($F(7, 1026) = 21.933, p < .001$). The inclusion of women's ACE Scale sum score explained an additional 3.0% ($\Delta R^2 = .030$) of the variance on the ECR avoidance-scale sum score, after controlling for age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy. This means that similar to the previous analysis, women's sum score on the ACE Scale on its own was a statistically significant predictor of their sum score on the ECR avoidance-scale ($\Delta F(1, 1026) = 35.681, p < .001$).

Table 9

Hierarchical multiple regression analysis: Predictors of attachment-related avoidance in close relationships in adulthood

Variable ^a	Model 1			Model 2		
	B	SE B	β	B	SE B	β
Constant	28.487***	2.826		26.566***	2.798	
Age	.403	.086	.152***	.397	.084	.150***
Education	-3.204	.481	-.213***	-2.833	.477	-.189***
Ethnic minority group status	2.773	1.572	.052	2.325	1.548	.044
Former mental health problems	3.342	.954	.109***	2.362	.952	.077*
Current mental health problems	9.419	1.835	.159***	7.930	1.822	.134***
Days into pregnancy	-.010	.011	-.028	-.010	.011	-.028
ACE Scale sum score				1.682	.282	.182***
R ²		.100***			.130***	
ΔR^2					.030***	
F		19.001			21.933	
ΔF					35.681	

Note. N = 1034. Model 1 = the first block of predictor or independent variables. Model 2 = the second block of predictor variables. B = unstandardized regression coefficient. SE = standard error for the unstandardized coefficient. β = standardized regression coefficient Beta. R² = amount of variance in outcome variable explained by predictor variables. ΔR^2 = additional explained variance. F = F test for the explained variance. ΔF = F test for the additional explained variance. ^a See table 2 for descriptions of the variables.

* $p < .05$. *** $p < .001$.

3.3.3 Measure of the effect size in the present study: Cohen's f^2

Selya, Rose, Dierker, Hedeker and Mermelstein (2012) stated that some of the frequently used measures of effect size are inappropriate for more complex data structures such as hierarchical data. Thus, choosing an effect size for analyses such as hierarchical linear modelling can be difficult. According to these researchers, one relatively uncommon but very informative, standardized measure of effect size is Cohen's f^2 . This measure allows an evaluation of the local effect size, i.e., one variable's effect size within the context of a

multivariate regression model. Furthermore, Cohen's f^2 is appropriate for calculating the effect size within a multiple regression model in which the independent variable of interest and the dependent variable are both continuous (Cohen, 1988). Hence, Cohen's f^2 appears to be an appropriate measure of the effect size in the present study.

The variation of Cohen's f^2 measuring local effect size is relevant to calculate the effect of the women's ACE Scale sum score on the ECR anxiety-scale sum score and the ECR avoidance-scale sum score. This variation is presented in the following form:

$f^2 = (R^2_{AB} - R^2_A) / (1 - R^2_{AB})$ (Selya et al., 2012, p. 2). In the present study, B = the ACE Scale sum score, A = the set of all other predictor variables (the women's age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy), R^2_{AB} = the proportion of variance accounted for by A and B together (.128 and .130, respectively) and R^2_A is the proportion of variance accounted for by A (.103 and .100, respectively). By inserting the R^2 -values from the regression analyses, Cohen's f^2 -value for the effect of the ACE Scale sum score on the ECR anxiety-scale sum score is .0287. The value for the effect of the ACE Scale sum score on the ECR avoidance-scale sum score is .0345. According to Cohen (1992), both of these values are characterized as small effect sizes (small = .02, medium = .15, large = .35).

The variation of Cohen's f^2 measuring global effect size is relevant to calculate the effect of the full model – including the women's age, education, ethnic minority group status, presence of former and current mental health problems, number of days into pregnancy at the time of answering the questionnaires and ACE scale sum score – on the ECR anxiety- and avoidance-scale. This variation is presented in the following form: $f^2 = R^2 / (1 - R^2)$ (Selya et al., 2012, p. 2). By inserting the R^2 -values from the regression analyses (.128 for the anxiety-scale and .130 for the avoidance-scale), $f^2 = .1468$ for the effect of the full model on the anxiety-scale sum score and $f^2 = .1494$ for the effect of the full model on the avoidance-scale sum score. These values are both characterized as medium effect sizes by Cohen (1992).

4 Discussion

The present study investigated whether adverse childhood experiences as reported retrospectively by the participating women were related to currently assessed attachment-related anxiety and avoidance in their romantic relationships in adulthood, and whether this relation was still present after controlling for possible confounding variables. The proposed hypothetical model is that the adverse childhood experiences – due to the internal working models of attachment and the persistence of attachment patterns throughout life – on their own are saliently associated with attachment-related anxiety and avoidance in the women's adult romantic relationships, after controlling for important socio-demographic characteristics.

4.1 The relation between the women's adverse childhood experiences and attachment-related anxiety and avoidance in their adult romantic relationships

4.1.1 Were the reported adverse childhood experiences related to currently assessed attachment-related anxiety and avoidance in adult romantic relationships?

In the present study, the correlation analyses showed that there was a moderate, positive association between the women's reported adverse childhood experiences and their reported attachment-related anxiety and avoidance in close relationships in adulthood. Increase in the number of adverse childhood experiences correlated moderately with increase in the amount of attachment-related anxiety and avoidance, as showed in the scatterplots (figure 3 and 4). Although the correlation coefficients were closer to small than high, as defined by Cohen (1992), the results confirmed the hypothesized positive and significant association between the number of such experiences and the amount of attachment anxiety and -avoidance. The strength of the relation will be discussed below.

4.1.2 Was this relation still present after controlling for possible confounding variables?

The regression analyses showed that the women's sum score on the ACE Scale made a unique, statistically significant contribution to both the ECR anxiety-scale and the ECR

avoidance-scale after controlling for the women's age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy at the time when they answered the questionnaires. When the ACE Scale sum score was added in model 2, an additional 2.5% of the variance on the ECR anxiety-scale and 3.0% of the variance on the ECR avoidance-scale were explained. This means that the ACE Scale sum score on its own explained 2.5% of the variance on the anxiety-scale sum score and 3.0% of the variance on the avoidance-scale sum score. Furthermore, in both analyses the ACE Scale sum score was the next strongest predictor. As hypothesized, the number of adverse childhood experiences predicted the amount of both attachment-related anxiety and avoidance in the women's close relationships in adulthood.

4.1.3 Strength of the relation between the adverse childhood experiences and the attachment-related anxiety and avoidance in adult romantic relationships

The women's adverse childhood experiences, taking place during the first 18 years of life but reported retrospectively in this study, were on their own significant contributors to currently assessed attachment-related anxiety and avoidance in adulthood. It is necessary to take a closer look at the strength of this relation.

A moderate, positive correlation

There was a moderate, positive correlation between the women's ACE Scale sum score and both the ECR anxiety-scale sum score and the ECR avoidance-scale sum score. As visually represented by the lines of best fit in the scatterplots (figure 3 and 4), an increase from zero to four points on the ACE Scale sum score equaled an increase of between 10 and 20 points on the ECR anxiety-scale sum score. Similarly, an increase from zero to four points on the ACE Scale sum score equaled an increase of around 10 points on the ECR avoidance-scale.

Considering that the potential range of each of the ECR subscale sum scores is from 18 to 126 points, and that there is no clinical cut-off score, an increase of maximum 20 points may seem to be relatively small. In comparison, in several previous studies an increase from zero to four adverse childhood experiences was considered to represent an increase from "low exposure" to "high exposure" – with a corresponding significantly increased probability of adverse health outcomes in adulthood (e.g. Dong et al., 2003; Dube et al., 2003b; Felitti et al., 1998). The present study showed that among the participating women, a similar increase

from “low” to “high exposure” of adverse events was associated with a relatively low increase in the attachment-related anxiety and avoidance in adulthood, as compared to the significantly high increase in the probability of adverse health outcomes in adulthood in the studies mentioned above. There may be several contributors to this discrepancy. The fact that a number of previous studies have reported an association between adverse childhood experiences and non-optimal physical and mental health outcomes, but that few of these have included insecure attachment patterns as a non-optimal mental health outcome, may reflect the challenge of measuring adult attachment. It may be more difficult to operationalize and measure adult attachment status than adult health problems and disease conditions. In the previously mentioned studies, adverse health outcomes were operationalized as health problems such as smoking, obesity, depressed mood, suicide attempts and substance abuse (Dube et al., 2003b; Felitti et al., 1998), as well as disease conditions including heart disease, cancer, stroke and diabetes (Felitti et al., 1998). It might be more convenient to provide accurate reports of health problems and disease conditions than accurate reports of the amount of attachment-related anxiety and avoidance in adult romantic relationships.

Also, differences in population size and characteristics may contribute in making the strength of the relation between adverse childhood experiences and attachment-related anxiety and avoidance in adult romantic relationships appear significantly lower than the strength of the relation between such experiences and other non-optimal physical and mental health outcomes. For instance, the present sample consisted of relatively young (*Mean* = 29.8 years) and highly educated (41.4% had four years or more at college or university) pregnant women (*Mean* = 164 days into pregnancy). It is possible that there are personality characteristics among relatively young and highly educated, pregnant women that may contribute to a lower amount of attachment-related anxiety and avoidance in adult close relationships, thus making the relation between the potential adverse childhood experiences and the attachment-related anxiety and avoidance appear weaker. This will be further discussed below. Although the present study found a weaker relation than the previously mentioned studies, it is reasonable to hypothesize that for many individuals, adverse childhood experiences may be as strongly related to attachment-related anxiety and avoidance in adult romantic relationships as to other non-optimal mental health outcomes.

Effect size: From explained variance to Cohen's f^2

Effect sizes are, according to Selya, et al. (2012), an important complement to null hypothesis significance testing in that they offer a measure of practical significance in terms of the magnitude of the effect. According to these researchers, one relatively uncommon but very informative, standardized measure of effect size is Cohen's f^2 . As previously mentioned, this measure allows an evaluation of the local effect size, i.e., one variable's effect size within the context of a multivariate regression model (Cohen, 1988).

By inserting the values of explained variance from the regression analyses in the variation of Cohen's f^2 measuring local effect size, the effect size of the women's adverse childhood experiences on both the attachment-related anxiety and the attachment-related avoidance in adult romantic relationships – after controlling for their age, education, ethnic minority group status, presence of former and current mental health problems and the number of days into pregnancy at the time of answering the questionnaires – can be characterized as small (Cohen, 1992). According to Cohen (1988), this is not an unusual finding. In psychological research it is rare to find large effect sizes. Due to the complexity of most psychological phenomenon, the most common is to find small or medium effects. A small but significant effect may still have a great impact on the phenomenon and individuals concerned.

4.2 Predictors of attachment-related anxiety and avoidance in the women's adult romantic relationships

The total variance explained by the full regression models was 12.8% on the ECR anxiety-scale sum score and 13.0% on the ECR avoidance-scale sum score. By inserting these values in the variation of Cohen's f^2 measuring global effect size, the effect size of the full model on both the attachment-related anxiety and the attachment-related avoidance can be characterized as medium (Cohen, 1992). This means that taken together, the women's number of adverse childhood experiences, age, education, ethnic minority group status, presence of former and current mental health problems and number of days into pregnancy at the time when they answered the questionnaires had a medium effect size on their attachment-related anxiety and avoidance in adult romantic relationships. The calculation of a small effect size (as defined by Cohen) of the women's adverse childhood experiences alone implies that the other predictors constituted a relevant part of the effect. Consistently, the results showed that several of the independent variables were strong predictors – some even

stronger than the number of adverse childhood experiences. The only independent variable that did not make a significant contribution to neither attachment anxiety nor attachment avoidance was the women's ethnic minority group status. That is, membership in an ethnic minority group did not contribute significantly to the prediction of the amount of attachment-related anxiety or avoidance. One possible explanation of this finding may be the relatively low percent (6.0) of the women reporting such membership. With a higher percent of participants with an ethnic minority group status, this variable might have been a stronger predictor and made a significant contribution. Alternatively, it is possible that ethnicity actually does not contribute significantly to attachment-related anxiety and avoidance in adult romantic relationships. Other factors may be more predictive. The stronger predictors evinced in the present study will be discussed next.

4.2.1 Predictors of attachment-related anxiety

The presence of former mental health problems was the strongest predictor of attachment-related anxiety. The results indicated that the presence of former mental health problems predicted a higher amount of attachment-related anxiety. This is perhaps not an unexpected finding. It may be reasonable to hypothesize that individuals with a history of mental health problems may have a higher probability of experiencing both attachment-related anxiety in their adult relationships and also anxiety in general. In psychological research and clinic, an association between anxiety and anxiety disorders and other mental disorders has routinely been found (e.g., DSM-IV-TR, American Psychiatric Association, 2000; Carr, 2006; Beidel & Stipelman, 2007) Thus, individuals with a history of mental health problems may have experienced anxiety associated with these problems and may experience anxiety as adults – whether or not it is related to their adult attachment. Both the attachment-related anxiety and the potential general anxiety may contribute to a high score on the ECR anxiety-scale. For instance, the questions 2 (“I worry about being abandoned”) and 14 (“I worry about being alone”) have a potential of measuring both attachment-related anxiety and general anxiety.

Also, the presence of mental health problems at the time when they answered the questionnaires was a strong predictor. Again, this might not be an unexpected finding. It makes sense that individuals who experience mental health problems have a higher probability of experiencing attachment-related anxiety in their romantic relationships. However, as discussed above, it may be difficult to distinguish attachment-related anxiety

from other forms of anxiety. Another noteworthy finding was that the women's age, education and number of days into pregnancy at the time when they answered the questionnaires made significant contributions to the ECR anxiety-scale sum score. Lower age, lower education and a higher number of days into pregnancy predicted a higher amount of attachment-related anxiety. There may be several explanations of these findings, including personality characteristics among individuals who are young and have a lower education that potentially may contribute to a higher amount of anxiety in relationships. Mediating factors may be instability in economy and increased life stress – potentially resulting in a higher amount of attachment anxiety in romantic relationships. This will be further discussed in the section below. Furthermore, a higher number of days into pregnancy imply that the birth is approaching, which may evoke both attachment-related anxiety and birth-related anxiety. According to Brodén (2004), the course of pregnancy is characterized by a preoccupation of thoughts and feelings about relationships. Additionally, anxiety of birth is a common phenomenon. About 25% of all pregnant women experience this type of anxiety (Brodén, 2004). Hence, it is not unexpected that being far into pregnancy predicted a higher amount of attachment-related anxiety. Again, the challenge of distinguishing attachment-related anxiety from other types of anxiety – in this case birth-related anxiety – is evident.

4.2.2 Predictors of attachment-related avoidance

The women's education was found to be the strongest predictor of attachment-related avoidance. The results indicated that lower education predicted a higher amount of adult attachment-related avoidance. Again, this finding may be explained in several ways. There might be personality characteristics that contribute both to lower education and avoidant attachment behaviours in adult romantic relationships. Erdheim, Wang & Zickar (2006) linked different types of commitment, such as emotional commitment, continuance commitment and normative commitment, to the personality traits specified in the five-factor model of personality (Digman, 1990; McCrae & John, 1992). It is possible that continuance commitment – which was linked to the trait Conscientiousness – may be related to education, and that emotional commitment – which was linked to Extraversion – may be related to attachment in romantic relationships (e.g., Mayer & Schoorman, 1998; Duemmler & Kobak, 2001). Thus, lower ability of continuance commitment might contribute to a lower education, and lower ability of emotional commitment might contribute to a higher amount of attachment-related avoidance in relationships. If a person has a low ability of commitment in

general, it is possible that this contributes both to lower education and a higher amount of attachment-related avoidance in the person's romantic relationships. However, besides the potential mediating role of personality traits and characteristics, there may be several other mediating contributors. Mediators between lower education and a higher amount of adult attachment avoidance (and possibly also anxiety) may be lower income as a result of lower education, higher instability in economy and life situation as a result of a lower income and thus a higher amount of life stress – potentially contributing to a higher amount of insecurity and attachment avoidance (and anxiety) in romantic relationships.

Other strong predictors of attachment-related avoidance were the presence of former and current mental health problems. As with attachment anxiety, one might expect that presence of former and current mental health problems were strong predictors of attachment avoidance. From psychological research and clinic, we know that experiences of mental disorders and other mental health problems may cause withdrawal from other people – often called social withdrawal. Different types of withdrawal, such as physical, social and emotional, can also be a symptom of mental illness in itself. For instance, avoidant personality disorder – which is one of several personality disorders listed in the DSM-IV-TR (American Psychiatric Association, 2000) – is characterized by marked avoidance of both social situations and close interpersonal relationships due to an excessive fear of rejection by others. Thus, it makes sense that individuals who have a history of mental health problems or current mental health problems, or both, potentially have a higher probability of experiencing attachment avoidance in their romantic relationships. Again, there might be a challenge of distinguishing attachment-related avoidance from withdrawal associated with other mental health problems – which might not be related to attachment in romantic relationships in general but still contribute to a high score on the ECR avoidance-scale.

4.3 Prevalence of adverse childhood experiences

In the present study, 36% of the participating women reported one or more adverse childhood experiences. In comparison, 64% of the participants in the ACE Study (Dube et al., 2003b), 79.5% of the participants in the Chicago Longitudinal Study (Mersky et al., 2013) and 72% of the participants in the Ontario Health Survey (Chartier et al., 2010) reported one or more such experiences. The differential findings related to the prevalence of adverse exposures may reflect social and economic differences between the American and Norwegian society.

Also, differences in sample size and characteristics may contribute. Furthermore, 4.8% of the participants in the present study, 12.5% of the participants in the ACE Study, 5.0% of females and 12.3% of men in the Chicago Longitudinal Study and 7% of participants in the Ontario Health Survey reported four or more adverse experiences in childhood. It should be noted that the prevalence of four or more adverse experiences appears to be more similar across the study populations than the prevalence of one or more such experiences. This suggests that there are common factors across populations and culture that contribute to the association between several adverse childhood experiences. In other words, there might be factors independent of nationality and culture that increase the probability of experiencing several adverse events.

The World Report on Violence and Health (Krug et al., WHO, 2002) emphasized that research has linked certain characteristics of the caregiver, as well as features of the family environment, to child abuse and neglect. While some factors – including demographic ones – are related to variation in the risk of being exposed to adverse societal events, others are related to the psychological and behavioural characteristics of the caregiver or to aspects of the family environment that may compromise parenting and lead to child maltreatment and related adverse events. For instance, the World Report emphasized that the size of the family, household overcrowding and unstable family environments can increase the risk of adverse events. Additionally, personality and behavioural characteristics of the caregiver, including low self-esteem, poor control of impulses, mental health problems and antisocial behaviour were emphasized – factors which may compromise parenting and be associated with disrupted social relationships, an inability to cope with stress and difficulty in reaching social support systems. Furthermore the report emphasized that parents who are uninformed and have unrealistic expectations about child development, show greater irritation and annoyance in response to their children's moods and behaviour, are more controlling and hostile and less supportive, affectionate, playful and responsive are more likely to be perpetrators than parents who do not have these characteristics. In addition, studies have investigated the intergenerational transmission of abusive parenting. It appears that this issue is complex. The report stated that research suggests that there is indeed a relation across generations, but that the importance of this risk factor may have been overstated. Other factors, including those mentioned, may be more predictive.

In the present study, the most prevalent adverse experiences were mental illness in the household (13.8%), parental loss (11.8%), substance abuse in the household (10.8%) and verbal abuse (10.0%). In comparison, in the ACE Study the most prevalent of the experiences were physical abuse (28.3%), substance abuse in the household (26.9%), parental loss (23.3%), sexual abuse (20.7%) and mental illness in the household (19.8%) (Dong et al., 2003). As one might expect, household mental illness, parental loss and household substance abuse were found to be some of the most prevalent experiences in both studies. However, the prevalence of physical and sexual abuse was found to be lower in the present study than expected, considering the findings from recent Norwegian investigations of the prevalence of such experiences (Mossige & Stefansen, 2007; Thoresen & Hjemdal, 2014). This discrepancy may have several explanations, including the sample size and characteristics, as well as the methods of measurement employed in the present study. As mentioned, this sample consisted of relatively young, highly educated and pregnant women. In the study reported by Mossige & Stefansen, the sample consisted of 7 000 seniors in high school, and the instrument was a questionnaire containing 28 pages of items. In Thoresen & Hjemdal's investigation, the sample consisted of 4 528 men and women aged 18-75 years, and the instrument was a computer assisted telephone interview. It is possible that such differences in study population and measures contributed to the differential findings related to the prevalence of various types of adverse childhood experiences. However, the present study and the investigations mentioned above all yielded consistent findings of a relatively high prevalence of adverse childhood experiences in Norway.

4.4 Prevalence of attachment-related anxiety and avoidance

The results showed that among the participating women, the average score on the ECR anxiety-scale was 44 points and the average score on the ECR avoidance-scale was 30 points. The current range was 18-114 points and 18-90 points, respectively, while the potential range was 18-126 points. This shows that the women on average reported that they experienced low to medium amount of attachment-related anxiety and avoidance. As mentioned, there is no clinical cut-off score for the original ECR Scale. It should be noted that the distributions of the sum scores on the two subscales – as showed in the histograms in figure 3 and 4 – are slightly different. Both are right-skewed, positive distributions, with the “tail” in the positive direction on the x-axis or number line. However, the distribution of the sum scores on the

avoidance-scale has a more clearly defined right-skewed distribution with the mean to the right of the median, while the distribution of the sum scores on the anxiety-scale is more similar to a normal distribution curve with the mean closer to the median. This implies that the women reported more differential amounts of attachment anxiety than attachment avoidance. On the avoidance-scale, a clear majority of the women got sum scores of between 20 and 50 points, while on the anxiety-scale the sum scores were more evenly distributed between 20 and 100 points.

There may be several explanations of this difference. One reason might be, as mentioned above, that the participants in the present study were relatively young and pregnant women who on average were 164 days into pregnancy at the time when they answered the questionnaires. It is possible that both attachment-related anxiety, birth-related anxiety and anxiety related to other mental health problems contributed to higher scores on this subscale. Also, pregnant women might experience less attachment avoidance because they are in the process of becoming mothers. Brodén (2004) assumed that the pregnancy, and especially the first pregnancy, is an important transitional period in life. A child is coming, the parents are about to be formed and a family is to be established. Similarly, Ammaniti (1991), Ammaniti et al. (1992) and Fava Vizziello, Antonioli, Cocci & Invernizzi (1993) reported that as pregnancy progresses, the soon-to-be-mother's representation of her partner – as a person, mate, and potential father – become more positive in general. During this phase, the pregnant woman is likely to imagine more resemblances between the future baby and the future father than between herself and the future baby (Stern, 1995). Furthermore, the women may have underreported the amount of attachment avoidance for the same reason; they are to become mothers – who are commonly expected to be secure and stable caregivers to constitute a secure base for the forthcoming child. Reporting a high amount of attachment-related avoidance may not be consistent with this ideal.

4.5 Adverse childhood experiences as a unique predictor of attachment-related anxiety and avoidance in adult romantic relationships

The present study yielded several findings. The most interesting was that the participating women's adverse childhood experiences made a unique, statistically significant contribution

to attachment-related anxiety and avoidance in their adult romantic relationships. As discussed, the effect was small as defined by Cohen and the explained variance was 2.5% of the amount of attachment-related anxiety and 3.0% of the amount of attachment-related avoidance. Two of the control variables – former mental health problems and education – were stronger predictors of attachment anxiety and avoidance, respectively, than the number of adverse childhood experiences. Obviously, these are important control variables. However, the number of adverse childhood experiences was a stronger predictor than the remaining control variables. More importantly; the number of adverse childhood experiences made a unique, significant contribution after controlling for the women's age, education, ethnic minority group status, presence of former and current mental health problems and the number of days into pregnancy at the time when they answered the questionnaires.

The finding yields support to the proposed hypothetical model, and is consistent with emerging information from research on brain development, trauma and parent-child interaction about the consequences of adverse childhood experiences on cognitive, emotional and social development. Recent neurobiological research has established that the nervous system in young children, due to its rapid development, is especially vulnerable to intense and painful stimulations as well as to the absence of stimulation (Perry, 1994). In parallel, trauma psychology research has established that the most damaging stressors are those that progress over time and occur in early childhood in the child-caregiver relationship (Herman, 1994). Perry explained:

These children must learn and grow despite a pervasive sense of threat. These children must adapt to this atmosphere of fear. Persisting fear and the neurophysiological adaptations to this fear can alter the development of the child's brain, resulting in changes in physiological, emotional, behavioral, cognitive and social functioning. (2001, p. 4).

Furthermore, attachment theorists emphasize that attachment is a fundamental motivation in all children. All children need to be attached to their caregivers, regardless of how they are treated. They adapt to be in relationships, and create meaning out of their conditions. As Bowlby (1988) stated, this is fundamental for their survival. The biggest threat is to not have attachment relationships. When a child is exposed to adverse events such as abuse, neglect and household dysfunctions, and the caregiver is the perpetrator, there is a paradox of

approach-avoidance behaviour resulting in an unsolvable situation. The child is likely to be filled with contradictory feelings that exceed its capacity to orient with organized behaviour and attention. In line with this, Main & Solomon (1990) found that several of the infants who had experienced their caregivers as frightening, scared and disorganized in the interaction, had developed a disorganized attachment pattern. It is generally assumed that children exposed to adverse childhood experiences are more likely than non-exposed to develop insecure or disorganized attachment patterns.

The present proposed hypothetical model was that these insecure and disorganized/disoriented attachment patterns in childhood, due to the internal working models of attachment and the persistence of attachment patterns throughout life, were related to insecure attachment patterns in adulthood. As Bowlby (1988) stated, the first attachment relationship is uniquely significant because it underlies and largely determines how the individual thinks, feels and acts in close relationships later in life. The internal working model are proposed to actively and dynamically contribute in shaping the individual's way of being and acting in close emotional relationships (Wennerberg, 2011). Attachment theorists emphasize that the daily interactions between a child and its caregiver form the basis from which the child later develops relationships (Hart & Schwartz, 2009). The main finding of the present study supports these aspects of attachment theory and the previous findings of transmission of insecure attachment patterns from childhood to adulthood. The participating women's adverse childhood experiences were on their own saliently associated with, and significantly contributed to, the amount of attachment-related anxiety and avoidance in the women's adult romantic relationships. Hence, the women who reported one or more adverse childhood experiences and higher amounts of attachment anxiety and avoidance may be hypothesized to have developed insecure attachment patterns in childhood and internal working models containing understandings of other people and the outside world as not trustworthy and unsafe. Such experiences of insecure attachment relationships in childhood and understandings and expectations of future close relationships may be assumed to transmit the insecure attachment behaviours into adult close relationships, resulting in anxious and/or avoidant adult attachment relationships. According to Mikulincer et al. (2003), there now appears to be a consensus that adult attachment consists of these two dimensions. The feeling of closeness may for some individuals increase their feelings of vulnerability and lack of control (James, 1994), thus increasing the anxiety and/or avoidance. Again, recall Felitti's statement: "As was demonstrated in the ACE Study, what happens in childhood – like a

child's footprints in wet cement – commonly lasts throughout life. Time does not heal; time conceals” (2009, p. 131). This appears to be true for many individuals. However, it is important to emphasize that in clinical work, assessment of the consequences of adverse childhood experiences must be done separately for each individual person.

4.6 Clinical implications

Butchart et al. (WHO, 2006) emphasized that child maltreatment is a huge global problem with a serious impact on society in general. Furthermore, they stated that intensifying child maltreatment prevention requires studies that point to where and how maltreatment takes place, measure its consequences and costs, and with this information set up, carry out and evaluate prevention programs addressing the underlying causes and risk factors. The present study found that 36% of the pregnant women reported at least one adverse childhood experience. 4.8% reported four or more such experiences. This supports previous findings of a relatively high prevalence of adverse childhood experiences in Norway. Furthermore, the number of adverse childhood experiences predicted the amount of attachment-related anxiety and avoidance in the women's close relationships in adulthood. There are several important clinical implications related to these findings.

First, as stated by WHO, it is essential to prevent childhood abuse, neglect and related adverse events. National strategy- and prevention programs addressing the underlying causes and risk factors are important steps in the right direction. Additionally, as emphasized by Braarud & Nordanger (2011), home visits have been found to be effective interventions. Donelan-McCall, Eckenrode & Olds (2009) stated that during the past 20 years, one of the most promising prevention strategies aimed at decreasing rates of child maltreatment has been to provide health services, parenting education and social support to pregnant women and families with young children in their own homes.

Second, adverse childhood experiences that have already happened must be identified early. Smith & Ulvund (2004) emphasized that damages from early relational trauma may be reversible if there is a significant improvement of the care. Similarly, attachment theory states that what was damaged in the relationships can only be healed through new positive and developmentally promotive relational experiences (Wennerberg, 2011). It is essential that children exposed to the adverse events as well as their caregivers get the help, support,

guidance and treatment they are in need of to prevent the potential damages from getting more extensive. Lanktree & Briere (2013) proposed that a multimodal treatment strategy, which takes into account both the panoply of symptoms and problems and the sociocultural environment in which the child is embedded, might be useful in complex cases where treatment approaches limited to a single modality (e.g., exposure therapy, cognitive therapy, or psychiatric medication) may be insufficient.

Third, an especially relevant clinical implication related to the findings of the present study is the importance of examining pregnant women's own relational childhood experiences. Because experiences of insecure attachment relationships in childhood are associated with insecure attachment behaviours in close relationships in adulthood, such examination is important with all adult individuals. However, it is especially important with pregnant women, who are a distinctive part of the population in that they are soon to be mothers and caregivers. Several health centres in Norway have implemented a screening of former and current mental health problems, substance abuse and domestic violence among pregnant women and families with young children, using instruments such as the Edinburgh Postnatal Depression Scale ([EPDS] Cox, Holden & Sagovsky, 1987). The scale is often used as a means to talk about possible depressive symptoms and thereby give an opening to discuss difficult feelings that otherwise may feel shameful to talk about during the post partum period. Possibly, this screening could include an examination of and conversation about potential adverse childhood experiences, based on the questions in the ACE Scale. Alternatively, the educational and training program "Early Intervention" – developed by the National Health Directorate – provides education in the use of the Abuse Assessment Screen (AAS) (Daae & Huus, Helsedirektoratet, 2012).

Fourth, another especially important implication is related to the general assumption of the transmission of parent-child relationships across generations (Brodén, 2004). Main et al. (2000) found that it was not the parents' own adverse childhood experiences that determined whether the child developed a secure attachment or not, but whether or not the parents had created a narrative of the past traumas. Wennerberg (2011) explained that it is the painful loss of meaning as a result of missing a coherent narrative that underlies the transmission of insecure attachment patterns. The parents' need to preserve their own consciousness of attachment, and to maintain their own defences against anxiety-provoking resignation feelings, is assumed to organize the way they care for their child – thus transferring their

insecure attachment pattern to the child. Similarly, Fraiberg, Adelson & Shapiro (1975) emphasized the “Ghosts in the Nursery” – the ‘visitors from the unremembered past of the parents’, causing the parent and the child to find themselves re-enacting a moment or a scene from another time with another set of characters. Fraiberg et al. described that in these cases, the baby has become a silent partner in a family tragedy in which the parents identify with the aggressors from their past. By repressing the associated affective experiences from their childhood adversities, such as terror, helplessness, anxiety, grief, shame and worthlessness, the parents may find themselves in an unconscious alliance and identification with the fearsome figures of their past. In this way, the parental past may be inflicted upon the child. Fraiberg et al. emphasized that through reviving these repressed affects in therapeutic work, in which the parents can re-experience them in the safety of the relationship to the therapist; the parents no longer need to inflict the pain upon their child. Through remembering and re-experiencing the affects, the parents may identify with “an injured child” (the childhood self) rather than the fearsome figures. The ghosts may then depart, and the afflicted parents may become the protectors of their children against the repetition of their own conflicted past. They may be able to say: “I would never want that to happen to my child”. In the same vein, Bowlby wrote that for mothers with parenting difficulties,

“ [...] a weekly interview in which their problems are approached analytically and traced back to childhood has sometimes been remarkably effective. Having once been helped to recognize and recapture the feelings which she herself had as a child and to find that they are accepted tolerantly and understandingly, a mother will become increasingly sympathetic and tolerant toward the same things in her child.” (1940, p. 23.)

Treatment approaches aimed at activating the mother’s attachment system, thus evolving the therapeutic relationship to an attachment relationship, are essential in the process of enhancing her parenting abilities and preventing a transmission of her insecure attachment pattern. Wennerberg stated: “The relationship to the therapist may create a new experience of security, which enables exploration and change of early relational patterns.” (2011, p. 268). If the mother experiences the therapist as a secure base, her exploration system may be activated. Winnicott (1960b) similarly described a “holding environment”, in which the mother identifies with the child and almost completely adapts to it – thus giving the child the

opportunity to experience a coherent existence. The mother's holding supports the child's non-integrated self, protects it from too intense experiences or stimuli, cares for its special needs and regards its sensitivity. Fonagy (1991) additionally emphasized the quality of the reflective functioning of the caregiver as predictive of the child's security of attachment, and Bion (1962) pointed to the role of the mother's capacity to mentally "contain" the affect state intolerable for the baby – and respond in terms of physical care in a manner that acknowledges the child's mental state yet serves to modulate unmanageable feelings. All these functions give the child a feeling of a friendly and trustworthy world created in the relationship with the mother. According to Brodén (2004), these are the most important ingredients in an attachment relationship. In the same way, the mother also needs a holding environment or "therapeutic holding". This may be characterized by attention, emotional presence and psychological availability of the therapist. Furthermore, empathy and responsiveness to the mother's developmental needs are essential to help her grow and at the same time provide comfort and security to her (Brodén, 2004). One intervention method specifically aimed at "holding" the parent and enhancing a secure attachment relationship to the child is The Circle of Security Intervention (Powell, Cooper, Hoffman & Marvin, 2014).

4.7 Limitations

4.7.1 Assessment of the women's adverse childhood experiences

There are several potential limitations related to the use of the Adverse Childhood Experiences Scale (ACE Scale) in the measurement of adverse experiences during childhood. First, the instrument is based on retrospective self-reports of adverse childhood experiences. The participants may have difficulty recalling certain events, as a result of memory impairments in general as well as memory impairments that can be a consequence of such exposures. Furthermore, several of the adverse experiences have a sensitive or socially "taboo" nature. Thus, an underreporting of the adverse childhood experiences may have occurred, potentially resulting in underestimates of the true strength of the relation between adverse childhood experiences and attachment-related anxiety and avoidance in adult close relationships. Consistently, longitudinal follow-up of adults whose childhood abuse was documented showed that their retrospective reports of childhood abuse were likely to underestimate the actual occurrence (Femina, Yeager & Lewis, 1990; Williams 1995). Hardt & Rutter (2004) similarly found that retrospective reports in adulthood of major adverse experiences in childhood involved a substantial rate of false negatives, and substantial

measurement error. However, they emphasized that false positive reports were rare, and that although several studies have shown some bias in retrospective reports, such bias were not sufficiently great to invalidate retrospective case-control studies of major adversities.

Second, the ACE Scale does not include a measure of the respondents' age at the time when they were exposed to the adverse events. It is generally assumed that exposure to such events in childhood has a biological impact that can fundamentally alter the structure and functioning of areas in the brain, thus compromising the emotional, behavioral, social, cognitive and physiological functioning of the child. Depending on the age and developmental level of the child when he or she was exposed to the adverse event, the consequences may be of various nature and extent. For instance, the impacts of an adverse exposure are likely to be different in a six months old infant and a 16 years old adolescent. Thus, this may be a weakness of the ACE Scale. In the present study, it would have been illuminating to investigate whether differences in the effect of the adverse experiences on the women's attachment-related anxiety and avoidance would have been related to how old they were when they were exposed to the adverse events.

Third, a potential weakness of the ACE Scale is the limited definition of adverse childhood experiences. Anda et al. (2010) emphasized that the term should not be conceptually limited to these experiences, referring to the May 2009 expert consultation between the WHO and the National Center for Chronic Disease Prevention and Health Promotion (CDC, Atlanta GA) in Geneva, Switzerland. This meeting was the beginning of a collaborative effort to build a framework for public health surveillance that can be used to define the global health burden of adverse childhood experiences. An important recommendation from the consultation was to expand the definition of adverse childhood experiences to include adverse experiences that occur in both developing and developed nations. The recommended expansion included forced marriage, witnessing criminal and collective violence in the community, early conscription, exposure to bullying, other forms of peer-to-peer violence, and sibling physical and emotional violence. The suggested expansion emphasizes the relation between multiple social dimensions that may be involved in adverse childhood experiences.

Fourth, the ACE Scale measures adverse childhood experiences across individuals. However, the specific consequences of such inadequate and harmful care depend on characteristics of

the individual child and his or her environment. Children experience traumatic events differently, and their capacity to deal with such events may depend on their age and developmental level (Borgen et al., 2011). The breadth of the adverse exposures, relationship to the perpetrator(s), presence of nonresponse by bystander(s) and insufficient protection and support from caregivers within and outside the family, in addition to several other risk and protective factors, are assumed to contribute. It is important to emphasize that in clinical work, assessment of the consequences of adverse childhood experiences must be done specifically for the individual person.

4.7.2 Assessment of the women's attachment-related anxiety and avoidance in adult romantic relationships

There are several potential limitations related to the use of the Experiences in Close relationships Scale (ECR Scale). This is a self-report measurement instrument, with the potential of being biased in the estimate of the amount of attachment-related anxiety and avoidance. As in the ACE Scale, several of the ECR Scale items may have a sensitive or socially "taboo" nature. Thus, an underreporting of the attachment-related anxiety and avoidance may have occurred. On the other hand, an overestimating of the attachment anxiety and avoidance may also have occurred. There might be a challenge in distinguishing attachment-related anxiety and avoidance from anxiety and avoidance associated with mental health problems such as anxiety disorders and disorders to which social withdrawal is related. These forms of anxiety and avoidance might not be related to attachment in close relationships but still contribute to high scores on the ECR Scale. In both cases, the potential result is a biased estimate of the true strength of the relation between adverse childhood experiences and attachment-related anxiety and avoidance in adult close relationships.

However, the development of instruments measuring adult attachment has been challenging. Currently, there are mainly two different types of adult attachment measurement instruments. On one hand, Main and her colleagues developed the Adult Attachment Interview (AAI) procedure (Hesse, 2008). They focused on the dynamics of internal working models that are revealed indirectly by the way a person talks about childhood relationships. This measure is based on the assumption that people are not conscious of these dynamics. On the other, Hazan & Shaver developed the precursor of the ECR Scale. In contrast to the AAI procedure, this type of instrument focuses on feelings and behaviours in close relationships of which a person is aware and which the person can describe fairly accurately (Bartholomew & Shaver,

1998). In the comparison of these two instruments, the validity of the self-report measure is most often questioned. However, Bartholomew & Shaver pointed to a number of studies showing that self-report measures of adult attachment patterns do relate significantly to ways in which a person discusses close relationships, to observations of marital communication, to patterns of self disclosure, and to seeking and providing social support under stressful conditions. In the present study, the self-report type of instrument – in this case the ECR Scale – was the most appropriate measure to use in the investigation of the pregnant women's adult attachment behaviours and feelings.

Another potential weakness is that the ECR anxiety-scale contains only one reversed item. Potentially, this makes it vulnerable to response bias. Also, both subscales contain some items that refer to “partners” (plural) and others that refer to “partner” (singular) – explained by Mikulincer & Shaver (2007) as an accidental result of taking the items from different scales and including whichever loaded highly on the two major factors. Furthermore, Mikulincer and Shaver emphasized that the ECR Scale measures the anxiety and avoidance dimensions, but not the secure-fearful and preoccupied-dismissive dimensions defined by Bartholomew (1990). They stated that it would be desirable to have equally precise and efficient measures of all four dimensions.

4.7.3 Characteristics of the study population

The present sample consisted solely of pregnant women. On average, they were 164 days into pregnancy at the time when they answered the questionnaires. Furthermore, they were relatively young, with an average age of 30 years, and relatively highly educated in that 41.4% had four years or more at college or university. Even though both age and level of education were controlled for in the present study, it should be noted that these characteristics, and especially that the sample consisted only of pregnant women, may contribute in making the findings less generalizable to the Norwegian adult population. For instance, as already discussed, the women are in the process of becoming mothers – which may have an impact on their responses on the ECR Scale. Pregnant women may report a lower amount of attachment-related anxiety and avoidance than the average Norwegian adult because they may actually experience less anxiety and avoidance during this period, and because they may want to appear resembling to the ideal of a secure, “holding” caregiver and environment for the forthcoming child. Reporting a high amount of attachment-related anxiety and avoidance might not be consistent with this ideal. However, although there are

challenges related to the generalization of the findings, this is probably the most important part of the population to investigate early relational experiences and attachment patterns and behaviours in adult romantic relationships. This information may be an essential part of the process of preventing the transmission of insecure attachment patterns and behaviours from the mothers to their children. Furthermore, the information may be significant in the process of preventing intergenerational transmission of adverse childhood experiences.

4.7.4 Control variables

In the present study, the chosen control variables were the women's age, education, ethnic minority group status, presence of former and current mental health problems, and number of days into pregnancy at the time when they answered the questionnaires. The results suggested that these are important control variables – some were stronger predictors of attachment-related anxiety and avoidance than the number of adverse childhood experiences. However, other control variables might have been included. The total variance explained by the full regression models was 12.8% of the attachment-related anxiety and 13.0% of the attachment-related avoidance. This shows that other independent variables would be significant contributors. Potential variables of interest are, for instance, the women's marital status at the time of answering the questionnaires, the number of children, and the job situation and income before pregnancy. Also, it would have been of interest to investigate whether differential types of former and current mental health problems made a differential contribution to the amount of attachment-related anxiety and avoidance. Further investigation of the relation between adverse childhood experiences and attachment-related anxiety and avoidance in adult romantic relationships, and of the persistent consequences of adverse childhood experiences such as relational traumas, is needed.

5 Conclusion

The present study investigated whether a sample of Norwegian pregnant women's adverse childhood experiences – taking place during the first 18 years of life but reported retrospectively in the present – were related to currently assessed attachment-related anxiety and avoidance in the women's romantic relationships in adulthood, after controlling for possible confounding variables. Previous studies over the last five decades have investigated and reported an association between adverse childhood experiences and various forms of non-optimal mental health outcomes, but very few have included insecure attachment behaviours in adulthood as a non-optimal mental health outcome.

The results of the present study showed that there was a moderate, positive association between the women's adverse childhood experiences and attachment-related anxiety and avoidance in their romantic relationships in adulthood. Furthermore, the adverse experiences made a unique, statistically significant contribution to the amount of attachment-related anxiety and avoidance after controlling for the women's age, education, ethnic minority group status, presence of former and current mental health problems and the number of days into pregnancy at the time when they answered the questionnaires. This yields support to the proposed hypothetical model of the association between such experiences in childhood and insecure attachment patterns in adulthood, due to the internal working models of attachment and the persistence of attachment patterns throughout life. The results are consistent with previous findings of a relation between adverse childhood experiences and insecure attachment patterns in childhood, and with findings of a transmission of insecure attachment patterns from childhood to adulthood.

The present study emphasizes the importance of examining pregnant women's relational childhood experiences and attachment behaviours in close relationships in adulthood, and the relevance of therapeutic work and “holding” through which the women may create a coherent narrative of their past, remember and re-experience potential repressed affects from their childhood and activate their attachment-system. This may be significant in the process of enhancing their parenting abilities and transmitting secure attachment relationships to their children. The present study may contribute to the understanding of the seriousness of the consequences of adverse childhood experiences, and provide potentially significant information related to the future prevention of such experiences.

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Appendix A

The English form of the original Adverse Childhood Experiences Scale:

(Felitti & Anda, 1998; Dong et al., 2003; Dube et al., 2003b)

We understand that the following questions are sensitive.

Therefore, your participation in this questionnaire is voluntary. If you choose to participate, be assured that your answers will remain strictly confidential and will be seen only by the clinician who is providing services to you.

Prior to your 18th birthday:

1. Did a parent or other adult in the household often or very often...
Swear at you, insult you, put you down, or humiliate you?
or
Act in a way that made you afraid that you might be physically hurt?
Yes No
If yes enter a "1" _____
2. Did a parent or other adult in the household often or very often...
Push, grab, slap, or throw something at you?
or
Ever hit you so hard that you had marks or were injured?
Yes No
If yes enter a "1" _____
3. Did an adult or person at least 5 years older than you ever...
Touch or fondle you or have you touch their body in a sexual way?
or
Attempt or actually have oral, anal, or vaginal intercourse with you?
Yes No
If yes enter a "1" _____
4. Did you often or very often feel that ...
No one in your family loved you or thought you were important or special?
or
Your family didn't look out for each other, feel close to each other, or support each other?
Yes No
If yes enter a "1" _____

5. Did you often or very often feel that ...
You didn't have enough to eat, had to wear dirty clothes,
and had no one to protect you?
or
Your parents were too drunk or high to take care of you
or take you to the doctor if you needed it?
Yes No
If yes enter a "1" _____
6. Was a biological parent ever lost to you through divorced,
abandonment, or other reason ?
Yes No
If yes enter a "1" _____
7. Was your mother or stepmother:
Often or very often pushed, grabbed, slapped, or had
something thrown at her?
or
Sometimes, often, or very often kicked, bitten, hit with a
fist, or hit with something hard?
or
Ever repeatedly hit over at least a few minutes or
threatened with a gun or knife?
Yes No
If yes enter a "1" _____
8. Did you live with anyone who was a problem drinker or
alcoholic or who used street drugs?
Yes No
If yes enter a "1" _____
9. Was a household member depressed or mentally ill or did a
household member attempt suicide?
Yes No
If yes enter a "1" _____
10. Did a household member go to prison?
Yes No
If yes enter a "1" _____

Appendix B

The Norwegian form of the original Adverse Childhood Experiences Scale, as used in the “Little in Norway”-study:

Vi skjønner at det kan være ubehagelig å svare på noen av spørsmålene nedenfor. Vi minner derfor om at dette er fortrolig informasjon som ikke andre enn autoriserte prosjektmedarbeidere vil få adgang til.

Hendte noe av dette før 18-årsdagen din?

1. Hendte det *ofte eller veldig ofte* at far eller mor eller en annen voksen som bodde hjemme hos dere, bannet til deg, fornærmet deg, trykket deg ned eller ydmyket deg?
eller

Handlet på en måte som gjorde at du ble engstelig for å bli fysisk skadet?

☐ Ja ☐ Nei

2. Hente det *ofte eller veldig ofte* at far eller mor eller en annen voksen som bodde hjemme hos dere puffet deg, grep tak i deg, slo deg eller kastet noe på deg?
eller

noen som helst gang slo deg så hardt at du fikk merker eller ble skadet?

☐ Ja ☐ Nei

3. Hendte det noen som helst gang at en voksen eller en som var minst 5 år eldre enn deg, berørte eller kjærtegnede deg på en seksuell måte, eller fikk deg til å berøre hans/hennes kropp på en seksuell måte?
eller

Prøvde eller faktisk hadde munn-, anal eller vaginal sex med deg?

☐ Ja ☐ Nei

4. Følte du *ofte eller veldig ofte* at

Ingen i familien din elsket deg eller syntes du var viktig eller spesiell?

eller

Familien din ikke tok vare på hverandre, følte seg knyttet til hverandre eller støttet hverandre?

☐ Ja ☐ Nei

5. Følte du ofte eller veldig ofte at

Du ikke fikk nok å spise, måtte gå med skitne klær og ikke hadde noen som passet på deg?

eller

Foreldrene dine var for fulle eller ruset til å passe på deg eller tok deg til lege hvis du trengte det?

☐ Ja ☐ Nei

6. Har du noen gang mistet en biologisk mor eller far på grunn av skilsmisse, ved at du ble forlatt eller av en annen grunn?

☐ Ja ☐ Nei

7. Ble din mor eller stemor:

Ofte eller veldig ofte puffet, grepet tak i eller slått, eller var mål for noe hardt som ble kastet mot henne?

eller

Av og til, ofte eller veldig ofte sparket, bitt, slått med en knyttneve eller noe hardt?

eller

Noen som helst gang slått gjentatte ganger i løpet av minst noen minutter eller truet med skytevåpen eller kniv?

☐ Ja ☐ Nei

8. Bodde du sammen med noen som hadde alkoholproblemer, var alkoholiker eller stoffmisbruker?

☐ Ja ☐ Nei

9. Var noen fra hjemmet ditt deprimert eller mentalt syk, eller prøvde å ta livet sitt?

☐ Ja ☐ Nei

10. Måtte noen fra hjemmet ditt sitte i fengsel?

☐ Ja ☐ Nei

Appendix C

The English form of the original Experiences in Close Relationships Scale:

(Brennan, Clark & Shaver, 1998, p. 69-70)

EXPERIENCES IN CLOSE RELATIONSHIPS

Instructions: The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by indicating how much you agree or disagree with it. Write the number in the space provided, using the following rating scale:

Disagree strongly	Neutral/mixed					Agree strongly
1	2	3	4	5	6	7

- ___ 1. I prefer not to show a partner how I feel deep down.
- ___ 2. I worry about being abandoned.
- ___ 3. I am very comfortable being close to romantic partners.
- ___ 4. I worry a lot about my relationships.
- ___ 5. Just when my partner starts to get close to me I find myself pulling away.
- ___ 6. I worry that romantic partners won't care about me as much as I care about them.
- ___ 7. I get uncomfortable when a romantic partner wants to be very close.
- ___ 8. I worry a fair amount about losing my partner.
- ___ 9. I don't feel comfortable opening up to romantic partners.
- ___ 10. I often wish that my partner's feelings for me were as strong as my feelings for him/her.
- ___ 11. I want to get close to my partner, but I keep pulling back.
- ___ 12. I often want to merge completely with romantic partners, and this sometimes scares them away.
- ___ 13. I am nervous when partners get too close to me.
- ___ 14. I worry about being alone.
- ___ 15. I feel comfortable sharing my private thoughts and feelings with my partner.
- ___ 16. My desire to be very close sometimes scares people away.
- ___ 17. I try to avoid getting too close to my partner.
- ___ 18. I need a lot of reassurance that I am loved by my partner.
- ___ 19. I find it relatively easy to get close to my partner.
- ___ 20. Sometimes I feel that I force my partners to show more feeling, more commitment.

- ___ 21. I find it difficult to allow myself to depend on romantic partners.
- ___ 22. I do not often worry about being abandoned.
- ___ 23. I prefer not to be too close to romantic partners.
- ___ 24. If I can't get my partner to show interest in me, I get upset or angry.
- ___ 25. I tell my partner just about everything.
- ___ 26. I find that my partner(s) don't want to get as close as I would like.
- ___ 27. I usually discuss my problems and concerns with my partner.
- ___ 28. When I'm not involved in a relationship, I feel somewhat anxious and insecure.
- ___ 29. I feel comfortable depending on romantic partners.
- ___ 30. I get frustrated when my partner is not around as much as I would like.
- ___ 31. I don't mind asking romantic partners for comfort, advice, or help.
- ___ 32. I get frustrated if romantic partners are not available when I need them.
- ___ 33. It helps to turn to my romantic partner in times of need.
- ___ 34. When romantic partners disapprove of me, I feel really bad about myself.
- ___ 35. I turn to my partner for many things, including comfort and reassurance.
- ___ 36. I resent it when my partner spends time away from me.

Appendix D

The Norwegian form of the original Experiences in Close Relationships Scale, as used in the “Little in Norway”-study:

Opplevelser i nære forhold:

Vennligst les gjennom påstandene nedenfor og ta stilling til hver enkelt av dem ved å bruke skalaen fra 1 til 7. Merk av bare ett tall for hver av påstandene.

	Slett ikke sant			Litt sant eller usikkert		Helt sant	
	1	2	3	4	5	6	7
1. Jeg foretrekker å ikke vise en partner hvordan jeg føler meg innerst inne. ○	○	○	○	○	○	○	
2. Jeg er redd for å bli forlatt.	○	○	○	○	○	○	○
3. Jeg liker veldig godt å være nær en kjæreste.	○	○	○	○	○	○	○
4. Jeg bekymrer meg mye for mine nære forhold.	○	○	○	○	○	○	○
5. Akkurat når partneren min begynner å komme nær meg, merker jeg at jeg trekker meg unna.	○	○	○	○	○	○	○
6. Jeg bekymrer meg for at kjærester ikke skal bry seg så mye om meg som jeg bryr meg om dem.	○	○	○	○	○	○	○
7. Jeg føler ubehag når en kjæreste ønsker å være veldig nær.	○	○	○	○	○	○	○
8. Jeg bekymrer meg en god del for at jeg skal miste partneren min.	○	○	○	○	○	○	○
9. Jeg føler meg ikke vel når jeg innleder kjæresteforhold.	○	○	○	○	○	○	○
10. Jeg ønsker ofte at min partners følelser for meg var like sterke som							

mine følelser for ham/henne.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Jeg ønsker å komme nær min partner, men jeg holder stadig tilbake.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Jeg ønsker ofte å gå helt opp i forholdet til kjærester, og det skremmer dem av og til bort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Jeg er nervøs når partnere kommer for nær meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Jeg er redd for å være alene.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Jeg liker godt å dele mine egne tanker og følelser med partneren min.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Mitt ønske om å være veldig nær skremmer av og til andre vekk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Jeg prøver å unngå å komme for nær partneren min.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Jeg trenger masse forsikringer om at partneren min elsker meg.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Jeg finner det nokså lett å komme nær partneren min.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Av og til føler jeg at jeg tvinger partnere til å vise sterkere følelser, mer forpliktelse.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Jeg synes det er vanskelig å tillate meg selv å støtte meg til kjærester.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Jeg er sjelden redd for å bli forlatt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. Jeg foretrekker å ikke være alt for nær kjærester.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Hvis jeg ikke kan få partneren min til å vise interesse for meg, blir jeg oppbrakt eller sint.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Jeg forteller partneren min nesten alt mulig.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. Det slår meg at min(e) partner(e) ikke ønsker å komme så nær som jeg skulle like. ☐ ☐ ☐ ☐ ☐ ☐ ☐
27. Jeg drøfter som regel mine problemer og bekymringer med partneren min. ☐ ☐ ☐ ☐ ☐ ☐ ☐
28. Når jeg ikke har et forhold, føler jeg meg noe redd og utrygg. ☐ ☐ ☐ ☐ ☐ ☐ ☐
29. Jeg føler meg vel ved å støtte meg til en kjæreste. ☐ ☐ ☐ ☐ ☐ ☐ ☐
30. Jeg blir frustrert når min partner ikke er til stede så mye som jeg skulle ønske. ☐ ☐ ☐ ☐ ☐ ☐ ☐
31. Jeg synes ikke det gjør noe å spørre kjærester om trøst, råd eller hjelp. ☐ ☐ ☐ ☐ ☐ ☐ ☐
32. Jeg blir frustrert hvis kjærester ikke er tilgjengelige når jeg trenger dem. ☐ ☐ ☐ ☐ ☐ ☐ ☐
33. Det hjelper å henvende seg til kjæresten min når jeg trenger det. ☐ ☐ ☐ ☐ ☐ ☐ ☐
34. Hvis kjærester ikke anerkjenner meg synes jeg veldig synd på meg selv. ☐ ☐ ☐ ☐ ☐ ☐ ☐
35. Jeg vender meg til partneren min for mange ting, også for å få trøst og oppmuntring. ☐ ☐ ☐ ☐ ☐ ☐ ☐
36. Jeg føler ubehag når partneren min bruker tid på å være borte fra meg. ☐ ☐ ☐ ☐ ☐ ☐ ☐

Appendix E

Supervisor's statement concerning length of the main thesis:

As the main supervisor of Ingrid Helen Lindboe, I confirm that it is my view that in order to fit all the tables and explanations of the tables into the text, it was necessary to exceed the usual page limit of 50 pages with 5 extra pages. The main body of the thesis is 55 pages and we have come to the conclusion that to shorten the thesis would make the text less clear.

Vibeke Moe